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UNION PUBLIC SERVICE COMMISSION

EXAMINATION NOTICE No 05/2025-CSP DATE: 22.01.2025

(LAST DATE FOR RECEIPT OF ONLINE APPLICATIONS: 11.02.2025 of CIVIL SERVICES EXAMINATION, 2025)

(The Commission's Website: www.upsc.gov.in)

IMPORTANT

1. CANDIDATES TO ENSURE THEIR ELIGIBILITY FOR THE EXAMINATION:

All candidates are requested to carefully read the Rules of Civil Services Examination notified by the Government (Department of Personnel and Training) and this Notice of Examination derived from these Rules. The Candidates applying for the examination should ensure that they fulfill all eligibility conditions for admission to examination. Their admission to all the stages of the examination will be purely **provisional** subject to satisfying the prescribed eligibility conditions. Mere issue of e-Admit Card to the candidate will not imply that his/her candidature has been finally cleared by the Commission. The Commission takes up verification of eligibility conditions with reference to original documents only after the candidate has qualified for Interview/Personality Test.

2. HOW TO APPLY:

Candidates are required to apply online by using the website http://upsconline.gov.in. It is essential for the applicant to register himself/herself first at One Time Registration (OTR) platform, available on the Commission's website, and then proceed for filling up the online application for the examination. OTR Profile (Registration) has to be registered only once in life time. This can be done anytime throughout the year. If the candidate is already registered, he/she can proceed straightway for filling up the Online Application for the examination.

2.1 Modification in OTR Profile (Registration):

In case, the candidate wants to effect any change in his/her OTR Profile (Registration) profile, it shall be allowed only once in the lifetime after the registration at OTR platform. The change in OTR profile (Registration) data shall be available till expiry of 7 days from the next day after the closure of application window of his/her first final application for any Examination of the Commission. In the case, the candidate after registration applies for the first time in this examination, the last date of modification of OTR Profile (Registration) would be **18.02.2025**.

2.2 Modification in application form (Other than OTR Profile):

The Commission has also decided to extend the facility of making correction(s) in any field(s) of the finally submitted Online Application Form for this examination from next day of the closure of the application window of this Examination. This window will remain open for 7 days from the date of opening of the same, i.e., from **12.02.2025 to 18.02.2025**. In case a candidate wants to carry out any change in

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his/her OTR Profile (Registration) during this period, then he/she should login to the OTR platform and do the needful accordingly. In other words, no change in the OTR Profile (Registration) can be made by visiting the window for Modification in application form.

2.3 The cadidates will not be allowed to withdraw their applications after the submission of the same.

2.4 Candidate should have details of one Photo ID Card viz. Aadhaar Card/Voter Card (EPIC)/PAN Card/Passport/Driving Licence/Any other Photo ID Card issued by the State/Central Government. The details of this Photo ID Card will have to be provided by the candidate while filling up the Online Application Form. This Photo ID Card will be used for all future reference and the candidate is advised to carry this Photo ID Card while appearing for Examination/Personality Test.

3. LAST DATE FOR RECEIPT OF APPLICATIONS:

The Online Applications can be filled upto **11th February, 2025** till 6:00 PM. The eligible candidates shall be issued an e-Admit Card on the last working day of the preceding week of the date of examination. The e-Admit Card will be made available in the UPSC website [https://upsconline.gov.in] for downloading by the candidates. No Admit Card will be sent by post.

4. PENALTY FOR WRONG ANSWERS:

Candidates should note that there will be penalty (negative marking) for wrong answers marked by a candidate in the Objective Type Question Papers.

5. Online Question Paper Representation Portal (QPRep):

The Commission has introduced a time frame of 7 days (a week) i.e. from the next day of the Examination Date to 6.00 p.m. of the 7th day is fixed for the candidates to make representations to the Commission on the questions asked in the Papers of the Examination. Such representation must be submitted through the **"Online Question Paper Representation Portal (QPRep)"** only by accessing the URL https://upsconline.gov.in/miscellaneous/QPRep/. No representation by email/post/hand or by any other mode shall be accepted and the Commission shall not involve into any correspondence with the candidates in this regard. No representation shall be accepted under any circumstances after this window of 7 days is over.

6. FACILITATION COUNTER FOR HELPLINE FOR GUIDANCE OF CANDIDATES:

In case of any guidance/information/clarification regarding their applications, candidature etc. candidates can contact UPSC's Facilitation Counter near gate 'C' of its campus in person or over Telephone No. 011-23385271/011-23381125/011-23098543 on working days between 10.00 hrs and 17.00 hrs.

7. MOBILE PHONES BANNED:

(a) The use of any mobile phone (even in switched off mode), pager or any electronic equipment or programmable device or storage media like pen drive, smart watches etc. or camera or blue tooth devices or any other equipment or related accessories either in working or switched off mode capable of being used as a communication device during the examination is strictly prohibited. Any infringement of these instructions shall entail disciplinary action including ban from future examinations.

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(b) Candidates are advised in their own interest not to bring any of the banned items including mobile phones/pagers to the venue of the examination, as no arrangement for safe-keeping will be made at the venue of the examination.

8. Candidates are advised not to bring any valuable/costly items to the venue of the examination, as no arrangement for safe-keeping will be made at the venue of the examination. Commission will not be responsible for any loss in this regard.

9. Instruction in respect of uploading of Photograph while filling up online application form :-

(a) The photograph, uploaded by candidate should not be more than **10 days old** from the start of the online application process (i.e. the application commencement date).

(b) Ensure that **the name of candidate** and the **date on which the photograph was taken** are clearly mentioned on the photograph.

(c) The candidate's **face** should occupy **3/4th of the space** in the photograph.

(d) The candidates must ensure that their appearance must match with their photograph at each stage of the Examination Process i.e. at the time of Preliminary, Main (Written) and Interview/Personality Test. For instance, If a candidate uploads a bearded photograph, he must appear with the same look in the Preliminary, Main (Written) and Interview/Personality Test. Same would be the case with spectacles, moustaches, etc.

10. The candidates should reach the venue of the Examination well in time at least 30 minutes prior to the commencement of each session of the Examination. No late entry will be allowed inside the Exam-venue under any circumstances.

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F.No.1/5/2024-E.I(B) : Preliminary Examination of the Civil Services Examination for recruitment to the Services and Posts mentioned below will be held by the Union Public Service Commission on 25th May, 2025 in accordance with the Rules published by the Department of Personnel & Training in the Gazette of India Extraordinary dated 22nd January, 2025. All candidates must carefully read the Civil Services Examination-2025 Rules together with all the Appendices along with the Annexures thereof and this Examination Notice derived from the CSE Rules-2025 in entirety for gaining awareness of the current Rules and Regulations as changes may have been incorporated since the previous Examination Rules.

(i) Indian Administrative Service
(ii) Indian Foreign Service
(iii) Indian Police Service
(iv) Indian Audit and Accounts Service, Group 'A'
(v) Indian Civil Accounts Service, Group 'A'
(vi) Indian Corporate Law Service, Group 'A'
(vii) Indian Defence Accounts Service, Group 'A'
(viii) Indian Defence Estates Service, Group 'A'
(ix) Indian Information Service, Group 'A'
(x) Indian Postal Service, Group 'A'
(xi) Indian Post & Telecommunication Accounts and Finance Service, Group 'A'
(xii) Indian Railway Management Service (Traffic), Group 'A'
(xiii) Indian Railway Management Service (Personnel), Group 'A'
(xiv) Indian Railway Management Service (Accounts), Group 'A'
(xv) Indian Railway Protection Force Service, Group 'A'
(xvi) Indian Revenue Service (Customs & Indirect Taxes) Group 'A'
(xvii) Indian Revenue Service (Income Tax) Group 'A'
(xviii) Indian Trade Service, Group 'A' (Grade III)
(xix) Armed Forces Headquarters Civil Service, Group 'B' (Section Officer's Grade)

(xx) Delhi, Andaman and Nicobar Islands, Lakshadweep, Daman & Diu and Dadra & Nagar Haveli Civil Service (DANICS), Group 'B'
(xxi) Delhi, Andaman and Nicobar Islands, Lakshadweep, Daman & Diu and Dadra & Nagar Haveli Police Service (DANIPS), Group 'B'
(xxii) Pondicherry Civil Service (PONDICS), Group 'B'
(xxiii) Pondicherry Police Service (PONDIPS), Group 'B'

The number of vacancies to be filled through the examination is expected to be approximately **979** which include **38** vacancies reserved for Persons with Benchmark Disability Category, i.e. **12** Vacancies for candidates of (a) blindness and low vision; **7** Vacancies for (b) deaf and hard of hearing; **10** Vacancies for (c) locomotor disability including cerebral palsy, leprosy cured, dwarfism, acid attack victims and muscular dystrophy; and **9** Vacancies for (e) multiple disabilities from amongst persons under clauses (a) to (c) including deaf-blindness. The final number of vacancies may undergo change after getting firm number of vacancies from Cadre Controlling Authorities. Reservation will be made for candidates belonging to Scheduled Castes, Scheduled Tribes, Other Backward Classes, the Economically Weaker Sections and Persons with Benchmark Disability in respect of vacancies as may be fixed by the Government.

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As per the policy notified by the Government for increasing the access of unemployed to job opportunities, the information of candidates who appeared in the final stage of Examination (Interview/ Personality Test) but not recommended, will be made accessible to any registered Private Company, Public Sector Undertaking, Statuary and Autonomous organisations of Government of India on the dedicated portal on the website of the Commission to identify suitable candidates in line of their requirements for providing employment. Short biodata of the candidates with their educational qualifications, contact numbers, details including their percentile (not absolute or percentage marks), etc will also be made accessible on this dedicated portal. The data available on this portal shall be restricted for the purpose of evaluation of sutability of the candidates for employment purpose only to these registered organisations. These lists will be made available after the Reserve List is utilized/exhausted after declaration of final result. It may be noted that there is no option for partial disclosure and choice once opted cannot be changed.

Candidates will be required to give their consent at the time of Interview/Personality Test, while downloading the e-Summon Letter from the Commission's website for the interview. A candidate may opt out of the scheme also and in that case his/her details will not be published by the Commission.

Besides sharing of the information of the non-recommended willing candidates of this examination, the Commission will not assume any responsibility or liability for the method and manner in which information related to such candidates is utilized by these registered organizations.

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Note : A list of Services Identified suitable for Persons with Benchmark Disability

Name of theService(s)	Category(ies) for which Identified	Suitable Category of Benchmark Disabilities [erstwhile Functinal Classification (FC)]	Functional Requirements [erstwhile Physical Requirements (PR)]
(1)	(2)	(3)	(4)
1. Indian AdministrativeService, **2**. Indian Foreign Service, **3.** Indian Audit and Accounts Service, Group 'A', **4.** Indian Civil AccountsService, **5.** Indian Corporate Law Service, Group 'A', **6.** Indian Defence Accounts Service, Group 'A', **7.** Indian Defence Estates Service, Group 'A', **8.** Indian Information Service, Group 'A', **9.** Indian Postal Service, Group 'A', **10.** Indian P and T Accounts and Finance Service,Group 'A', **11.** Indian Revenue Service (Customs and Indirect Taxes), Group 'A', **12.** Indian Revenue Service (IT), Group 'A', **13.** Indian Trade Service, Group 'A' (Grade III), **14.** Indian Railway Management Service (Traffic), Group 'A', **15.** Indian Railway Management Service (Personnel), Group 'A', **16.** Indian Railway Management Service (Accounts), Group 'A', **17.** Armed Forces Headquarters (AFHQ) Civil Service, Group 'B' (Section Officer's Grade), **18.** Delhi, Andaman and Nicobar Islands , Lakshadweep , Daman and Diu and Dadra and Nagar Haveli Civil Service (DANICS), Gr. 'B', **19.** Pondicherry Civil Service (PONDICS),Group 'B'	(i) Locomotor disability including Cerebral Palsy, Leprosy Cured, Dwarfism, Acid Attack Victims and Muscular Dystrophy	OA, OL, BA, OAL, BLA, BLOA, BL, BAOL, SD, SI, CP, LC, Dw, AAV, MDy	S, SE, H, RW, C
	(ii) Blindness and Low Vision	LV, B	MF, PP, S, ST, W, L,C, RW (including in braille/ software), H,KC, BN
	(iii) Deaf and Hard of Hearing	D, HH	MF, PP, S, ST, W, L, C, RW, KC,BN
	(iv) Multiple disability from amongst only above three categories	Any combination of FCs from different categories as allowed under (i) to (iii), except the combination of blind & deaf (B+D)	S, RW (including in braille/ software), C
Note: If there is any change in the 'Suitable Categories of Bechmark Disabilities' and 'Functional Requirements' in any of the Service(s) as prescribed above, the same shall be notified subsequently.			

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List of Abbriviations used:

Categories of Disability	LD	Locomotor Disability
	VI	Visual Impairment
	HI	Hearing Impairment
	MD	Multiple Disabilities
Sub-Categories	OA	One Arm
	OL	One Leg
	BA	Both Arms
	OAL	One Arm One Leg
	BLA	Both Legs and Arms
	BLOA	Both Legs One Arm
	BL	Both Legs
	BAOL	Both Arms and One Leg
	SD	Spinal Deformity
	SI	Spinal Injury
	CP	Cerebral Palsy
	LC	Leprosy Cured
	Dw	Dwarfism
	AAV	Acid Attack Victims
	MDy	Muscular Dystrophy
	LV	Low Vision
	B	Blind
	D	Deaf
	HH	Hard of Hearing
	MD	Multiple Disabilities
Functional Requirements	S	Sitting
	ST	Standing
	W	Walking
	SE	Seeing
	H	Hearing
	RW	Reading and Writing
	C	Communication
	MF	Manipulation with Fingers
	PP	Pulling & Pushing
	L	Lifting
	KC	Kneeling and Crouching
	BN	Bending
	JU	Jumping
	CL	Climbing

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2 (A)(i) Centres of Civil Services (Preliminary) Examination: The Examination will be held at the following Centres:

Sl. No.	CENTRE	Sl. No.	CENTRE	Sl. No.	CENTRE
1	AGARTALA	29	GURGAON	57	PORTBLAIR
2	AGRA	30	GWALIOR	58	PRAYAGRAJ (ALLAHABAD)
3	AHMEDABAD	31	HYDERABAD	59	PUDUCHERRY
4	AIZAWL	32	IMPHAL	60	PUNE
5	AJMER	33	INDORE	61	RAIPUR
6	ALIGARH	34	ITANAGAR	62	RAJKOT
7	ALMORA (UTTARAKHAND)	35	JABALPUR	63	RANCHI
8	ANANTHAPURU	36	JAIPUR	64	SAMBALPUR
9	CHHATRAPATI SAMBHAJINAGAR [AURANGABAD (MAHARASHTRA)]	37	JAMMU	65	SHILLONG
10	BAREILLY	38	JODHPUR	66	SHIMLA
11	BENGALURU	39	JORHAT	67	SILIGURI
12	BHOPAL	40	KARGIL	68	SRINAGAR
13	BILASPUR (CHHATISGARH)	41	KOCHI	69	SRINAGAR (UTTARAKHAND)
14	CHANDIGARH	42	KOHIMA	70	SURAT
15	CHENNAI	43	KOLKATTA	71	THANE
16	COIMBATORE	44	KOZHIKODE (CALICUT)	72	THIRUVANANTHAPURAM
17	CUTTACK	45	LEH	73	TIRUCHIRAPALLI
18	DEHRADUN	46	LUCKNOW	74	TIRUPATI
19	DELHI	47	LUDHIANA	75	UDAIPUR
20	DHARAMSHALA (HIMACHAL PRADESH)	48	MADURAI	76	VARANASI
21	DHARWAR	49	MANDI (HIMACHAL PRADESH)	77	VELLORE
22	DISPUR	50	MUMBAI	78	VIJAYAWADA
23	FARIDABAD	51	MYSURU	79	VISHAKHAPATNAM
24	GANGTOK	52	NAGPUR	80	WARANGAL
25	GAUTAM BUDDH NAGAR	53	NASIK		
26	GAYA	54	NAVI MUMBAI		
27	GHAZIABAD	55	PANAJI (GOA)		
28	GORAKHPUR	56	PATNA		

(ii) Centres of Civil Services (Main) Examination:-

Sl. No.	CENTRE	Sl. No.	CENTRE	Sl. No.	CENTRE
1	AHMEDABAD	9	DELHI	17	PATNA
2	AIZAWL	10	DISPUR (GUWAHATI)	18	PRAYAGRAJ (ALLAHABAD)
3	BANGALURU	11	HYDERABAD	19	RAIPUR
4	BHOPAL	12	JAIPUR	20	RANCHI
5	CHANDIGARH	13	JAMMU	21	SHILLONG
6	CHENNAI	14	KOLKATA	22	SHIMLA
7	CUTTACK	15	LUCKNOW	23	THIRUVANANTHAPURAM
8	DEHRADUN	16	MUMBAI	24	VIJAYAWADA

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The Centres and the date of holding the examination as mentioned above are liable to be changed at the discretion of the Commission. Applicants should note that there will be a ceiling on the number of candidates allotted to each of the Centres, except Chennai, Dispur, Kolkata and Nagpur. Allotment of Centres will be on the "**first-apply-first allot**" basis, and once the capacity of a particular Centre is attained, the same will be frozen. Applicants, who cannot get a Centre of their choice due to ceiling, will be required to choose a Centre from the remaining ones. Applicants are, thus, advised that they may apply early so that they could get a Centre of their choice.

NB : Notwithstanding the aforesaid provision, the Commission reserves the **right to change the Centres at its discretion if the situation demands.** All the Examination Centres for Civil Services (Preliminary), Examination, 2025 will cater to examination for Persons with Benchmark Disability in their respective Centres. Candidates admitted to the examination will be informed of the time table and place or places of examination. The candidates should note that no request for change of Centre will be entertained.

(B) Plan of Examination:

The Civil Services Examination will consist of two successive stages (**vide Appendix I Section-I**)

(i) Civil Services (Preliminary) Examination (Objective type) for the selection of candidates for the Main Examination; and

(ii) Civil Services (Main) Examination (Written and Interview) for the selection of candidates for the various Services and posts noted above.

B.1. A candidate who is willing to apply for Civil Services Examination shall be required to apply on-line and submit the requisite information and supporting documents towards various claims, such as date of birth, category [viz. SC/ST/OBC/ EWS/PwBD/Ex-Servicemen], educational qualification and Service preferences etc. as may be sought by the Commission alongwith the Online Application Form. The failure to provide the required information/documents alongwith the Registration and Online Application Form will entail cancellation of candidature for the examination.

B.2 The Commission shall provide a window of 10 (Ten) days after the declaration of result of Civil Services (Preliminary) Examination for taking cadre preference from the qualified candidates. All the qualified candidates will mandatorily fill the cadre preference along with the fee of Rs. 200 for admission into the Civil Services (Main) Examination.

B.3. The Commission shall also provide a window of 15 (Fifteen) days from the date of declaration of result of written part of Civil Services (Main) Examination to the candidates qualified for Personality Test/Interview. The candidates as per Note 1 below Rule 6 of CSE, 2025 shall be required to update their details/educational qualification status (whether appearing/appeared) and to produce/upload the proof of passing of the requisite qualifying examination at the specified module/portal, failing which such candidates will not be allowed to appear in the Personality Test/Interview and his/her candidature will be liable to be cancelled.

Note: In this period, all the candidates qualified for Personality Test shall also be provided an option to update Correspondence/Permanent Postal Address, Higher Educational Qualification, Achievement in different fields (if any), Employment Details/Service Experience, details of the Service allocated on the basis

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of earlier/previous Civil Services Examinations (if any) and Service and Cadre Preferences for the current examination. The details updated in this window will be treated as final and no request for any change in these fields received through any other mode will be entertained.

B.4. A candidate shall be required to mandatorily indicate order of preferences only for those Services which are participating in the Civil Services Examination-2025 and for which the candidate is interested to be allocated to in case of eventual selection. In case of recommendation of candidature by UPSC for Service Allocation, the candidate shall be considered by the Government for allocation to one of those Services for which the preference has been indicated by the candidate in the Online Application Form subject to fulfillment of other conditions. **In case preference for none of the Services is indicated, the candidate will not be considered for Service Allocation.**

A candidate who wishes to be considered for Indian Administrative Service or Indian Police Service shall be required to indicate, as and when asked for by the Commission, and in the manner prescribed by it, their cadre preference in case of appointment to the IAS or IPS.

Note-I: The candidates are advised to indicate preferences for various services or posts very carefully. Attention is also invited to Rule 21 (1) of Civil Services Examination, 2025 in this connection.

Note-II: The candidates are advised to periodically visit DoPT's website https://dopt.gov.in or https://cseplus.nic.in for information or details about Service Allocation, Cadre allotment, etc.

Note-III: As per the extant Cadre Allocation Policy applicable for the Civil Services Examination-2025, the candidates who wish to indicate IAS/IPS as their Service preference are advised to indicate, as and when asked for by the Commission, and in the manner prescribed by it, their cadre preference in case of appointment to the IAS or IPS.

B.5. No change in preference for Services and Cadre (applicable for IAS/IPS) once submitted by a candidate would be permitted except as provided in Para B.3. above.

3. Eligibility Conditions:

(I) Nationality

(1) For the Indian Administrative Service, the Indian Foreign Service and the Indian Police Service, a candidate must be a citizen of India.

(2) For other services, a candidate must be either:—

(a) a citizen of India, or

(b) a subject of Nepal, or

(c) a subject of Bhutan, or

(d) a Tibetan refugee who came over to India before 1st January, 1962 with the intention of permanently settling in India, or

(e) a person of Indian origin who has migrated from Pakistan, Burma, Sri Lanka, East African countries of Kenya, Uganda, the United Republic of Tanzania, Zambia, Malawi, Zaire, Ethiopia and Vietnam with the intention of permanently settling in India.

Provided that a candidate belonging to categories (b), (c), (d) and (e) shall be a person in whose favour a certificate of eligibility has been issued by the Government of India.

A candidate in whose case a certificate of eligibility is necessary, may be admitted to the examination

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but the offer of appointment may be given only after the necessary eligibility certificate has been issued to him/her by the Government of India.

(II) Age Limits:

(1) A candidate must have attained the age of 21 years and must not have attained the age of 32 years on the 1st of August, 2025 i.e., the candidate must have been born not earlier than 2nd August, 1993 and not later than 1st August, 2004.

(2) The upper age-limit prescribed above will be relaxable:

(a) up to a maximum of five years if a candidate belongs to a Scheduled Caste or a Scheduled Tribe;

(b) up to a maximum of three years in the case of candidates belonging to Other Backward Classes who are eligible to avail of reservation applicable to such candidates;

(c) up to a maximum of three years in the case of Defence Services Personnel, disabled in operations during hostilities with any foreign country or in a disturbed area and released as a consequence thereof;

(d) up to a maximum of five years in the case of ex-servicemen including Commissioned Officers and Emergency Commissioned Officers (ECOs)/ Short Service Commissioned Officers (SSCOs) who have rendered at least five years Military Service as on 1st August, 2025 and have been released:

(i) on completion of assignment (including those whose assignment is due to be completed within one year from 1st August, 2025, otherwise than by way of dismissal or discharge on account of misconduct or inefficiency); or

(ii) on account of physical disability attributable to Military Service; or

(iii) on invalidment.

(e) up to a maximum of five years in the case of ECOs/SSCOs who have completed an initial period of assignment of five years of Military Service as on 1st August, 2025 and whose assignment has been extended beyond five years and in whose case the Ministry of Defence issues a certificate that they can apply for civil employment and that they will be released on three months notice on selection from the date of receipt of offer of appointment.

(f) up to a maximum of 10 years in the case of candidates belonging to Persons with Benchmark Disabilities (PwBD) categories viz.

(i) blindness and low vision;

(ii) deaf and hard of hearing;

(iii) locomotor disability including cerebral palsy, leprosy cured, dwarfism, acid attack victims and muscular dystrophy;

(iv) autism, intellectual disability, specific learning disability and mental illness;

(v) multiple disabilities from amongst person under clauses (i) to (iv) including deaf-blindness.

Note-I : Candidates belonging to either the SC or the ST or the OBC category who are also covered under any other clauses of para 3(II)(2) above, viz. those coming under the category of Ex-servicemen or PwBD, will be eligible for grant of cumulative age-relaxation under both categories.

Note-II : The term Ex-servicemen will apply to the persons who are defined as Ex-servicemen in the Ex-

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servicemen (Re-employment in Civil Services and Posts) Rules, 1979, as amended from time to time.

Note-III : The age concession under para 3(II)(2) (d) and (e) will be admissible to Ex-servicemen i.e. a person who has served in any rank whether as combatant or non-combatant in the Regular Army, Navy and Air Force of the Indian Union and who either has been retired or relieved or discharged from such service whether at own request or being relieved by the employer after earning pension.

Note-IV : Notwithstanding the provision of age-relaxation under para 3(II) (2) (f) above, candidates of PwBD category will be considered to be eligible for appointment only if they (after such Medical Examination as the Government or appointing authority, as the case may be, may prescribe) are found to satisfy the requirements of physical and medical standards for the concerned Services to be allocated to the candidates of PwBD category by the Government.

Note-V : Save as provided under para 3(II) (2) above, the age-limits prescribed can in no case be relaxed.

(3) The date of birth, accepted by the Commission is that entered in the Matriculation or Secondary School Leaving Certificate or in a certificate recognised by an Indian University as equivalent to Matriculation or in an extract from a Register of Matriculates maintained by a University which extract must be certified by the proper authority of the University or in the Higher Secondary examination certificate or an equivalent examination certificate. The certificate in support of the date of birth is required to be submitted by a candidate only at the time of applying for the Civil Services Examination. No other document relating to age like horoscopes, affidavits, birth extracts from Municipal Corporation, Service records and the like will be accepted.

Note-I : Candidate should note that only the date of birth as recorded in the Matriculation or Secondary School Leaving Certificate or in an equivalent certificate as mentioned in para 3 (II) (3) above and issued prior to the date of submission of application will be accepted by the Commission, and no subsequent request for its change will be considered or granted.

Note-II : Candidates should also note that once a date of birth has been submitted by them in the application form and entered in the records of the Commission for the purpose of admission to an Examination, no change will be allowed subsequently or at any other Examination of the Commission on any grounds whatsoever.

(III) Minimum Educational Qualification:

A candidate must hold a Graduate degree of any of the Universities incorporated by an Act of the central or State Legislature in India or other educational institutions established by an Act of Parliament or declared to be deemed as a University under Section 3 of the University Grants Commission Act, 1956 or possess an equivalent qualification.

Note-I: Candidates who have appeared at a qualifying examination the passing of which would render them educationally qualified for the Commission's Examination but have not been informed of the result as also the candidates who intend to appear at such a qualifying examination will also be eligible for admission to the written part of Civil Services Examination, 2025. However, all such candidates, who are declared qualified by the Commission for Interview/Personality Test, will be required to produce proof of passing of the requisite qualifying examination within the time limit prescribed in Rule 13 of CSE, 2025.

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Only valid proof of passing the qualifying examination viz. Degree Certificate/Final Mark Sheet/Provisional Degree Certificate etc. as are normally issued to the candidate by the competent authority after the formal declaration of results by the University/Boards may be accepted. Proof of completion of internship is required in case of MBBS/BDS/Veterinary Science etc. and equivalent degree.

Note-II: In exceptional cases, the Commission may treat a candidate who does not have any of the foregoing qualifications as a candidate, provided that the candidate has passed an examination conducted by any other institution the standard of which in the opinion of the Commission justifies the admission to the Civil Services Examination.

Note-III: Candidates possessing professional and technical qualifications which are recognised by Government as equivalent to professional and technical degree would also be eligible for admission to the Civil Services Examination.

Note-IV: Candidates who have passed the final professional M.B.B.S or any other equivalent professional examination leading to a medical degree or certificate but have not completed their internship by the time of submission of their applications for the Civil Services Examination, will be provisionally admitted to the Civil Services Examination, provided they submit along with their application a copy of certificate from the concerned authority of the University/Institution that they had passed the requisite final professional examination. In such cases, the candidates will be required to produce at the time of their interview the original degree or a certificate from the concerned competent authority of the University/Institution that they had completed all requirements (including completion of internship) for the award of the Degree.

(IV) Number of attempts:

Every candidate appearing at the examination, who is otherwise eligible, shall be permitted six (6) attempts at the CSE. However, relaxation in the number of attempts will be available to the SC/ST/OBC and PwBD category candidates who are otherwise eligible. The number of attempts available to such candidates as per relaxation is as under:

Number of attempts	**Category to which the Candidate Belongs**		
	SC /ST	**OBC**	**PwBD**
	Unlimited	09	09 for GL/EWS/OBC Unlimited for SC/ST

Note-I: The terms – GL for General, EWS for Economically Weaker Sections, SC for Scheduled Castes, ST for Scheduled Tribes, OBC for Other Backward Classes and PwBD for Persons with Benchmark Disability – are used for denoting the categories of candidates taking an attempt at the Examination.

Note-II: An attempt at a Preliminary Examination shall be deemed to be an attempt at the Civil Services Examination.

Note-III: If a candidate actually appears in any one paper in the Preliminary Examination, it will be deemed that the candidate has made an attempt at the Examination.

Note-IV: Notwithstanding any subsequent disqualification/cancellation of candidature, the fact of

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appearance of the candidate at the Examination will count as an attempt.

(V) Restrictions on applying for the examination:

(1) A candidate who is appointed to the Indian Administrative Service (IAS) or the Indian Foreign Service (IFS) based on the results of an earlier Examination and continues to be a member of that Service will not be eligible to appear at the Civil Services Examination-2025. In case such a candidate is appointed to the IAS or IFS after the Civil Services (Preliminary) Examination-2025 is over and the candidate continues to be a member of that Service, the candidate shall not be eligible to appear in the Civil Services (Main) Examination-2025 notwithstanding having qualified in the Civil Services (Preliminary) Examination-2025. If such a candidate is appointed to the IAS or IFS after the commencement of the Civil Services (Main) Examination-2025 but before the result thereof is declared by the Commission and continues to be a member of that Service, the candidate shall not be considered for appointment to any Service/Post on the basis of the result of the CSE-2025.

(2) A candidate who has been selected or appointed to the Indian Police Service on the basis of the results of the earlier examination shall not be eligible to opt for or allocated to Indian Police Service on the basis of the result of CSE-2025.

(VI) Medical and Physical Standards: Candidates must be physically fit according to physical standards for admission to Civil Services Examination, 2025 as per guidelines given in Appendix-III of Rules for Examination published in the Gazette of India Extraordinary dated 22nd January, 2025.

4. FEE: Candidates (Except Female/SC/ST/Persons with Benchmark Disability Candidates who are exempted from payment of fee) are required to pay fee of Rs. 100/- (Rupees One Hundred only) either by remitting the money in any Branch of State Bank of India by cash or by using Net Banking facility of any bank or by using Visa/Master/RuPay/Credit/Debit Card/UPI Payment.

Applicants who opt for "Pay by Cash" mode should print the system generated Pay-in-slip during part II registration and deposit the fee at the counter of SBI Branch on the next working day only. "Pay by Cash" mode will be deactivated at 11.59 P.M. of 10th February, 2025 i.e. one day before the closing date; however applicants, who have generated their Pay-in- Slip before it is deactivated, may pay at the counter of SBI Branch during banking hours on the closing date. Such applicants who are unable to pay by cash on the closing date i.e. during banking hours at SBI Branch, for reasons whatsoever, even if holding valid pay-in-slip will have no other offline option but to opt for available online Debit/Credit Card/UPI Payment or Internet Banking payment mode on the closing date i.e. till 06:00 P.M. of 11th February, 2025.

For the applicants in whose case payments details have not been received from the bank they will be treated as fictitious payment cases and a list of all such applicants shall be made available on the Commission website within two weeks after the last day of submission of online application.These applicants shall also be intimated through e-mail to submit copy of proof of their payment to the Commission at the address mentioned in the e-mail. The applicant shall be required to submit the proof within 10 days from the date of such communication either by hand or by speed post to the Commission. On receipt of documentary proof, genuine fee payment cases will be considered and their applications will be revived, if they are otherwise eligible. In case, no response is received from the applicants their applications shall be summarily rejected and no further correspondence shall be entertained in this regard.

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All female candidates and candidates belonging to Scheduled Caste/ Scheduled Tribe/ Persons with Benchmark Disability categories are exempted from payment of fee. No fee exemption is, however, available to OBC/EWS candidates and they are required to pay the prescribed fee in full.

Persons with Benchmark Disability are exempted from the payment of fee provided they are otherwise eligible for appointment to the Services/Posts to be filled on the results of this examination on the basis of the standards of medical fitness for these Services/Posts (including any concessions specifically extended to the Persons with Benchmark Disability). A candidate of Persons with Benchmark Disability claiming fee concession will be required by the Commission to submit along with their Registration and Online Application Form, a certified copy of the Certificate of Disability from a Government Hospital/Medical Board in support of his/her claim for belonging to Persons with Benchmark Disability.

NB: Notwithstanding, the aforesaid provision for fee exemption, a candidate of Persons with Benchmark Disability will be considered to be eligible for appointment only if the candidate (after such physical examination as the Government or the Appointing Authority, as the case may be, may prescribe) is found to satisfy the requirements of physical and medical standards for the concerned Services/Posts to be allocated to candidates of Persons with Benchmark Disability by the Government.

Note I: Applications without the prescribed Fee (unless remission of Fee is claimed) shall be summarily rejected.

Note II: Fee once paid shall not be refunded under any circumstances nor can the fee be held in reserve for any other examination or selection.

Note III: If any candidate who took the Civil Services Examination held in 2024 wishes to apply for admission to this examination, he/she must submit his/her application without waiting for the results or an offer of appointment.

Note IV: Candidates admitted to the Civil Services (Main) Examination will be required to pay a further fee of Rs. 200/- (Rupees Two hundreds only) (Except exempted category i.e. SC/ST/PwBD/Women) through a window of 10 (Ten) days to be provided after declaration of Result of Civil Services (Preliminary) Examination.

5. How to Apply:

(a) Candidates are required to apply online by using the website https://upsconline.gov.in. It is essential for the applicant to register himself/herself first at One Time Registration (OTR) (Registration) platform, available on the Commission's website, and then proceed for filling up the online application for the examination. OTR (Registration) has to be registered only once in life time. This can be done anytime throughout the year. If the candidate is already registered, he/she can proceed straightway for filling up the online application for the examination.

(i) Modification in OTR Profile (Registration):

In case, the candidate wants to effect any change in his/her OTR Profile (Registration), it shall be allowed only once in the lifetime after the registration. The change in OTR Profile (Registration) data shall be available till expiry of 7 days from the next day after the closure of application window of his/her first

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final application for any Examination of the Commission. In the case, the candidate after registration of OTR applies for the first time in this examination last date of modification of OTR would be 18.02.2025.

(ii) Modification in application form (Other than OTR Profile Registration):

The Commission has also decided to extend the facility of making correction(s) in any field(s) of the Online Application Form for this examination from next day of the closure of the application window of this Examination. This window will remain open for 7 days from the date of opening of the same, i.e., from **12.02.2025 to 18.02.2025**. In case a candidate wants to carry out any change in his/her OTR profile during this period, then he/she should login to the OTR platform and do the needful accordingly. In other words, no change in the OTR Profile (Registration) can be made by visiting the window for Modificationin application form.

(iii) The cadidates will not be allowed to withdraw their applications after the submission of the same.

(b) All candidates, whether already in Government Service, Government owned industrial undertakings or other similar organizations or in private employment should submit their applications direct to the Commission.

Persons already in Government Service, whether in a permanent or temporary capacity or as work charged employees other than casual or daily rated employees or those serving under the Public Enterprises are however, required to submit an undertaking that they have informed in writing to their Head of Office/Department that they have applied for the Examination. Candidates should note that in case a communication is received from their employer by the Commission withholding permission to the candidates applying for/appearing at the examination, their application will be liable to be rejected/candidature will be liable to be cancelled.

NOTE 1: While filling in his/her Online Application Form, the candidate should carefully decide about his/her choice of centre for the Examination. If any candidate appears at a centre other than the one indicated by the Commission in his/her Admission Certificate, the papers of such a candidate will not be evaluated and his/her candidature will be liable to cancellation.

NOTE 2: The Persons with Benchmark Disabilities in the categories of blindness, locomotor disability (both arm affected – BA) and cerebral palsy will be provided the facility of scribe, if desired by the person. In case of other category of Persons with Benchmark Disabilities as defined under section 2(r) of the RPWD Act, 2016, the facility of scribe will be allowed to such candidates on production of a certificate to the effect that the person concerned has physical limitation to write, and scribe is essential to write examination on behalf, from the Chief Medical Officer/ Civil Surgeon/ Medical Superintendent of a Government Health Care institution as per proforma at Appendix - V. The candidates have discretion of opting for his/her own scribe or request the Commission for the same. The details of scribe i.e. whether own or the Commission's and the details of scribe in case candidates are bringing their own scribe, will be sought at the time of filling up the application form online. Suitable provisions in Online Application Form have been made.

NOTE 3: The qualification of the Commission's scribe as well as own scribe will not be more than the minimum qualification criteria of the examination. However, the qualification of the scribe should always be matriculate or above.

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NOTE 4: The Persons with Benchmark Disabilities in the category of blindness, locomotor disability (both arm affected – BA) and cerebral palsy will be allowed Compensatory Time of twenty minutes per hour of the examination. In case of other categories of Persons with Benchmark Disabilities, this facility will be provided on production of a certificate to the effect that the person concerned has physical limitation to write from the Chief Medical Officer/ Civil Surgeon/ Medical Superintendent of a Government Health Care institution as per proforma at Appendix - V.

NOTE-5: Candidates applying for Civil Services Examination, 2025 will be required to indicate information such as (a) detail of Centres for Civil Services (Main) Examination and Indian Forest Service (Main) Examination (b) Optional subject to be selected for the examination, (c) Medium of examination for Civil Services (Main) Examination, (d) Medium of Examination for Optional Subject if he/she chooses any Indian Language as the Medium of Examination for Civil Services (Main) Examination and (e) compulsory Indian Language for Civil Services (Main) Examination at the time of the filling up online application form itself. No request for changes in these details once online application form is submitted shall be entertained by the Commission.

The candidates applying for the Civil Services Examination should ensure that they fulfil all the eligibility conditions for admission to the Examination. Their admission at all the stages of Examination for which they are admitted by the Commission viz. Civil Services (Preliminary) Examination, Civil Services (Main) Examination – either Written or the Interview/Personality Test – will be purely provisional, subject to their satisfying the prescribed eligibility conditions. If on verification at any time before or after the Preliminary Examination, Main Examination (Written) and Interview/Personality Test, it is found that they do not fulfil any of the eligibility conditions, their candidature for the Examination will be cancelled by the Commission. The decision of the Commission as to the eligibility or otherwise of a candidate for admission to the Examination shall be final.

If any of their claims is found to be incorrect, they may render themselves liable to disciplinary action by the Commission in terms of Rule 19 of the Rules for the Civil Services Examination, 2025 reproduced below:

(1) A candidate who is or has been declared by the Commission to be guilty of:-

- (a) Obtaining support for candidature by the following means, namely:-
  - (i) offering illegal gratification to; or
  - (ii) applying pressure on; or
  - (iii) blackmailing, or threatening to blackmail any person connected with the conduct of the examination; or
- (b) impersonation; or
- (c) procuring impersonation by any person; or
- (d) submitting fabricated/incorrect documents or documents which have been tampered with; or
- (e) uploading irrelevant or incorrect photo/signature in the application form in place of actual photo/signature; or
- (f) making statements which are incorrect or false or suppressing material information; or
- (g) resorting to the following means in connection with the candidature for the examination, namely:-
  - (i) obtaining copy of question paper through improper means; or

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(ii) finding out the particulars of the persons connected with secret work relating to the examination; or

(iii) influencing the examiners; or

(h) being in possession of or using unfair means during the examination; or

(i) writing obscene matter or drawing obscene sketches or irrelevant matter in the scripts; or

(j) misbehaving in the examination hall including tearing of the scripts, provoking fellow examinees to boycott examination, creating a disorderly scene and the like; or

(k) harassing, threatening or doing bodily harm to the staff employed by the Commission for the conduct of the examination; or

(l) being in possession of or using any mobile phone, (even in switched-off mode), pager or any electronic equipment or programmable device or storage media like pen drive, smart watches etc. or camera or bluetooth devices or any other equipment or related accessories (either in working or switched-off mode) capable of being used as a communication device during the examination; or

(m) violating any of the instructions issued to candidates along with their admission certificates permitting them to take the examination; or

(n) attempting to commit or, as the case may be, abetting the commission of all or any of the acts specified in the foregoing clauses;

In addition to being liable to criminal prosecution, shall be disqualified by the Commission from the Examination held under these Rules; and/or shall be liable to be debarred either permanently or for a specified period:-

(i) by the Commission, from any examination or selection held by them;

(ii) by the central government from any employment under them;

and shall be liable to face disciplinary action under the appropriate rules if already in service under Government;

Provided that no penalty under this rule shall be imposed except after:-

(i) giving the candidate an opportunity of making such representation in writing as the candidate may wish to make in that behalf; and

(ii) taking the representation, if any, submitted by the candidate within the period allowed for this purpose, into consideration.

(2) Any person who is found by the Commission to be guilty of colluding with a candidate(s) in committing or abetting the commission of any of the misdeeds listed at the clauses (a) to (m) above will be liable to action in terms of the clause (n) in Rule 19 (1) above.

Note: "If a candidate is found to be in possession or using unfair means, may not be allowed to continue in the said exam as soon as the incident comes to notice of the Examination functionaries and the action against the candidates may be taken in consultation with the Commission. Further, the candidate may also not be allowed in any of the subsequent papers of the said examination."

6. LAST DATE FOR ONLINE SUBMISSION OF APPLICATIONS:

The Online Applications can be filled upto 11.02.2025 till 6:00 P.M. after which the link will be

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disabled. Detailed instructions regarding filling of online application is available at Appendix- II.

7. CORRESPONDENCE WITH THE COMMISSION:

The Commission will not enter into any correspondence with the candidates about their candidature except in the following cases:

(i) The eligible candidates shall be issued an e-Admit Card on the last working day of the preceding week of the date of examination. The e-Admit Card will be made available on the UPSC website [www.upsc.gov.in] for downloading by candidates. No Admit Card will be sent by post. If a candidate does not receive his e-Admit Card or any other communication regarding his/her candidature for the examination on the last working day of the preceding week of the date of examination, he/she should at once contact the Commission. Information in this regard can also be obtained from the Facilitation Counter located in the Commission's Office either in person or over phone Nos. 011-23381125/011- 23385271/011-23098543. In case no communication is received in the Commission's Office from the candidate regarding non-receipt of his/her e-Admit Card at least three days before the commencement of the examination, he/she himself/herself will be solely responsible for non-receipt of his/her e- Admit Card. No candidate will ordinarily be allowed to take the examination unless he/she holds an e-Admit Card for the examination. On downloading of e-Admit Card, check it carefully and bring discrepancies/errors, if any, to the notice of UPSC immediately.

The candidates should note that their admission to the examination will be purely provisional based on the information given by them in the Application Form. This will be subject to verification of all the eligibility conditions by the UPSC.

The mere fact that an e-Admit Card to the Examination has been issued to a candidate, will not imply that his/her candidature has been finally cleared by the Commission or that entries made by the candidate in his/her Registration and Online Application Form for the Civil Services Examination have been accepted by the Commission as true and correct. Candidates may note that the Commission takes up the verification of eligibility conditions of a candidate, with reference to original documents, only after the candidate has qualified for Civil Services (Main) Examination. Unless candidature is formally confirmed by the Commission, it continues to be provisional.

The decision of the Commission as to the eligibility or otherwise of a candidate for admission to the Examination shall be final.

Candidates should note that the name in the Admit Card in some cases, may be abbreviated due to technical reasons.

(ii) In the event of a candidate downloading more than one Admit Card from the Commission's website, he/she should use only one of these Admit Card for appearing in the examination and report about the other(s) to the Commission's Office.

(iii) Candidates are informed that as the Preliminary Examination is only a screening test, no marks sheets will be supplied to successful or unsuccessful candidates and no correspondence will be entertained by the Commission, in this regard.

(iv) Candidates must ensure that their emails IDs given in their online application are valid and active.

Important: All communications to the Commission should invariably contain the following particulars.

1. Name and year of the examination.
2. Registration ID (RID)
3. Roll Number (if received)
4. Name of candidate (in full and in block letters)

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5. Complete postal address as given in the application.
6. Valid and Active E-mail ID.

N.B. I. Communication not containing the above particulars may not be attended to.

N.B. II. Candidates should also note down their RID number for future reference. They may be required to indicate the same in connection with their candidature for the Civil Services (Main) Examination.

8. Reservation against vacancies for Persons with Benchmark Disability:

The eligibility for availing reservation against the vacancies reserved for the Persons with Benchmark Disabilities shall be the same as prescribed in "The Rights of Persons with Disabilities Act, 2016 (RPwD Act, 2016)". The candidates of Multiple Disabilities will be eligible for reservation under category (e)-Multiple Disabilities only of Section 34(1) of RPwD Act, 2016 and shall not be eligible for reservation under any other categories of disabilities i.e. (a) to (d) of Section 34(1) of RPwD Act, 2016 on account of having 40% and above in any of these sub-categories of PwBD.

Provided further that the candidates from Persons with Benchmark Disability category shall also be required to meet special eligibility criteria in terms of 'Suitable Category of Benchmark Disabilities' and 'Functional Requirements' [erstwhile Functional Classification and Physical Requirements (abilities/disabilities) (FC&PR)] consistent with requirements of the identified Service/post as may be prescribed by the Government.

Note-I: The details of 'Suitable Category of Benchmark Disabilities' and 'Functional Requirements' of Services participating in CSE-2025 are indicated in **Appendix-IV** of the Rules which are identified and prescribed by the Government as per the provisions of Section 33 and 34 of the Rights of Persons with Disabilities Act, 2016.

Note-II: Persons with Benchmark Disability with only those category(ies) of disability(ies) mentioned in Para-1 of this Examination Notice shall be eligible to apply for the Examination under PwBD category. Therefore, candidates concerned are advised to read it carefully before applying appropriately for admission to the Examination.

Note-III: Candidates belonging to Persons with Benchmark Disability category are likely to have been previously tested and in possession of related medical certificates even before applying for admission to the Examination. However, it is to be noted clearly that the prescribed Medical Examination as per these Rules, also including that for benchmark disability category(ies), shall be mandatory and only the results of the prescribed Medical Examination shall be deemed valid for assessing whether a PwBD category candidate meets the requirements to be appointed.

9. Eligibility for Availing Reservation:

(1) A candidate will be eligible to get the benefit of community reservation only in case the particular caste to which the candidate belongs is included in the list of reserved communities issued by the Central Government.

(2) The OBC candidates applying for CSE-2025 must produce OBC (Non-Creamy Layer) certificate based on the income for the Financial Year (FY) 2021-2022 and 2022-2023 and 2023-2024 and issued

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on/after 01.04.2024 (after the completion of FY 2023-24) but not later than the closing date of the Online Application Form for Civil Services Examination-2025 i.e. 11th February, 2025.

(3) A candidate will be eligible to get the benefit of the Economically Weaker Section reservation only in case the candidate meets the criteria issued by the Central Government and is in possession of requisite Income & Asset Certificate based on income for Financial Year (FY) 2023-2024 and issued on/after 01.04.2024 (after the completion of FY 2023-24) but not later than the closing date of the Online Application Form for Civil Services Examination-2025 i.e. 11th February, 2025.

10. Candidates seeking reservation/relaxation benefits available for SC/ST/OBC/EWS/PwBD/Ex-servicemen must ensure that they are entitled to such reservation/relaxation as per eligibility prescribed in the Rules/Notice. They should also be in possession of all the requisite certificates in the prescribed format in support of their claim as stipulated in the Rules/Notice for such benefits by the closing date of the online application of Civil Services Examination, 2025.

11. The closing date fixed for the receipt of the Online Application Form of Civil Services Examination-2025 will be treated as the date for determining the OBC status (including that of creamy layer) of the candidates.

12. Change of Category:

If the category indicated by a candidate in the Registration and Online Application Form for Civil Services Examination is Unreserved category but the candidate subsequently writes to the Commission to change the category to a reserved one, such request shall not be entertained by the Commission. Further, once a candidate has chosen a reserved category, no request shall be entertained for change to other reserved category viz. SC to ST, ST to SC, OBC to SC/ST or SC/ST to OBC, SC to EWS, EWS to SC, ST to EWS, EWS to ST, OBC to EWS, EWS to OBC. No Reserved category candidates other than those who qualified each stage of the Examination on General standard, shall be allowed to change (on their request or as decided by the Commission/Government based on the documents submitted by them) their category from reserved to unreserved or claim the vacancies (Service/Cadre) for unreserved category after the declaration of final result by UPSC. In cases where such candidates do not qualify on General Standard, their candidature shall be cancelled. Further, no candidate belonging to any sub-category of Persons with Benchmark Disabilities (PwBD) shall be allowed to change the sub-category of disability.

While the above principle will be followed in general, there may be a few cases where there was a gap of not more than 3 months between the issuance of a Government Notification enlisting a particular community in the list of any of the reserved communities and the date of submission of the application by the candidate. In such cases, the request of change of category from Unreserved to Reserved may be considered by the Commission on merit.

In case of a candidate becoming a Candidate belonging to Person with Benchmark Disability during the course of the examination process, the candidate must produce valid document of acquiring a disability to the extent of 40% or more as defined under the RPwD Act, 2016 to consider drawing the benefits of reservation as available to the Persons with Benchmark Disability (PwBD) category.

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13. Withdrawal of applications: The cadidates will not be allowed to withdraw their applications after the submission of the same.

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JOINT SECRETARY
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APPENDIX I

SECTION I: PLAN OF EXAMINATION

The Civil Services Examination comprises two successive stages:

(i) Civil Services (Preliminary) Examination (Objective Type) for the selection of candidates for Civil Services (Main) Examination; and

(ii) Civil Services (Main) Examination (Written and Interview/Personality Test) for the selection of candidates for the various Services and posts.

2. The Civil Services (Preliminary) Examination will consist of two papers of Objective type (multiple choice questions) and carry a maximum of 400 marks in the subjects set out in sub-section (A) of Section II. This examination is meant to serve as a screening test only; the marks obtained in the Civil Services (Preliminary) Examination by the candidates who are declared qualified for admission to the Civil Services (Main) Examination will not be counted for determining their final order of merit. The number of candidates to be admitted to the Civil Services (Main) Examination will be about twelve to thirteen times the total approximate number of vacancies to be filled in the year through this Examination. Only those candidates who are declared by the Commission to have qualified in the Civil Services (Preliminary) Examination in the year will be eligible for admission to the Civil Services (Main) Examination of that year provided they are otherwise eligible for admission to the Civil Services (Main) Examination.

Note I: The Commission will draw a list of candidates to be qualified for Civil Services (Main) Examination based on the criterion of minimum qualifying marks of 33% in General Studies Paper-II of Civil Services (Preliminary) Examination and total qualifying marks of General Studies Paper-I of Civil Services (Preliminary) Examination as may be determined by the Commission.

Note II: There will be negative marking for incorrect answers as detailed below:

(i) There are four alternatives for the answers to every question. For each question for which a wrong answer has been given by the candidate, one-third (0.33) of the marks assigned to that question will be deducted as penalty.

(ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happen to be correct and there will be same penalty as above for that question.

(iii) If a question is left blank i.e. no answer is given by the candidate, there will be no penalty for that question.

3. The Civil Services (Main) Examination will consist of a Written Examination and an Interview/Personality Test. The Written Examination will consist of 9 papers of conventional essay type in the subjects set out in sub-section (B) of Section-II out of which two papers will be of qualifying in nature. [Also see Note (ii) under Para-I of Section II-(B)]. Marks obtained for all the compulsory papers (Paper-I to Paper-VII) and Marks obtained in Interview/Personality Test will be counted for ranking.

4.1 Candidates who obtain such minimum qualifying marks in the written part of the Civil Services (Main) Examination as may be fixed by the Commission at their discretion, shall be summoned by them for an Interview/Personality Test, vide sub-section (C) of Section-II. The number of candidates to be summoned for Interview/Personality Test will be about twice of the number of vacancies to be filled. The Interview/Personality Test will carry 275 marks (with no minimum qualifying marks).

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4.2 Marks thus obtained by the candidates in the Civil Services (Main) Examination (Written part as well as Interview/Personality Test) would determine their final ranking. Candidates will be allotted to the various Services keeping in view their ranks in the examination and the preferences expressed by them for the various Services and posts.

SECTION II: Scheme and Subjects for the Preliminary and Main Examination

A. PRELIMINARY EXAMINATION:

The Examination shall comprise of two compulsory Papers of 200 marks each.

Note:

(i) Both the question papers will be of the objective type (multiple choice questions) and each will be of two hours duration.

(ii) The General Studies Paper-II of the Civil Services (Preliminary) Examination will be a qualifying paper with minimum qualifying marks fixed at 33%.

(iii) The question papers will be set both in Hindi and English.

(iv) Details of the syllabi are indicated in Part A of Section III.

B. MAIN EXAMINATION:

The Written Examination will consist of the following papers:—

Qualifying Papers:

Paper-A

(One of the Indian Language to be selected by the candidate from the Languages included in the Eighth Schedule to the Constitution). **300 Marks**

Paper-B

English **300 Marks**

Papers to be counted for merit:

Paper-I

Essay **250 Marks**

Paper-II

General Studies-I **250 Marks**

(Indian Heritage and Culture, History and Geography of the World and Society)

Paper-III

General Studies -II **250 Marks**

(Governance, Constitution, Polity, Social Justice and International relations)

Paper-IV

General Studies -III **250 Marks**

(Technology, Economic Development, Bio-diversity, Environment, Security and Disaster Management)

Paper-V

General Studies -IV **250 Marks**

(Ethics, Integrity and Aptitude)

Paper-VI

Optional Subject - Paper 1 **250 Marks**

Paper-VII

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Optional Subject - Paper 2	**250 Marks**
Sub Total (Written test)	**1750 Marks**
Personality Test	**275 Marks**
==========	==========
Grand Total	**2025 Marks**

Candidates may choose any one of the optional subjects from amongst the list of subjects given in para 2 below:—

Note:

(i) The papers on Indian languages and English (Paper A and paper B) will be of Matriculation or equivalent standard and will be of qualifying nature. The marks obtained in these papers will not be counted for ranking.

(ii) Evaluation of the papers, namely, 'Essay', 'General Studies' and Optional Subject of all the candidates would be done simultaneously along with evaluation of their qualifying papers on 'Indian Languages' and 'English' but the papers on Éssay', General Studies and Optional Subject of only such candidates will be taken cognizance who attain 25% marks in 'Indian Language' and 25% in English as minimum qualifying standards in these qualifying papers.

(iii) The paper A on Indian Language will not, however, be compulsory for candidates hailing from the States of Arunachal Pradesh, Manipur, Meghalya, Mizoram, Nagaland and Sikkim.

(iv) The paper A on Indian Language will not, however, be compulsory for Candidates belonging to Persons with Benchmark Disability (only Hearing Impairment sub-category) provided that they have been granted such exemption from 2nd or 3rd language courses by the concerned education Board/University. The candidate needs to provide an undertaking/self declaration in this regard in order to claim such an exemption to the Commission.

(v) Marks obtained by the candidates for the Paper I-VII only will be counted for merit ranking. However, the Commission will have the discretion to fix qualifying marks in any or all of these papers.

(vi) For the Language medium/literature of languages, the scripts to be used by the candidates will be as under:—

Language	***Script***
Assamese	Assamese
Bengali	Bengali
Gujarati	Gujarati
Hindi	Devanagari
Kannada	Kannada
Kashmiri	Persian
Konkani	Devanagari
Malayalam	Malayalam
Manipuri	Bengali or Meitei Mayek
Marathi	Devanagari
Nepali	Devanagari
Odia	Odia
Punjabi	Gurumukhi
Sanskrit	Devanagari
Sindhi	Devanagari or Arabic

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Tamil	Tamil
Telugu	Telugu
Urdu	Persian
Bodo	Devanagari
Dogri	Devanagari
Maithilli	Devanagari
Santhali	Devanagari or Olchiki

Note 1: For Santhali language, question paper will be printed in Devanagari script; but candidates will be free to answer either in Devanagari script or in Olchiki.

Note 2: For Manipuri Language, question paper will be printed in Bengali Script; but candidates will be free to answer either in Bengali Script or in Meitei Mayek Script.

2. List of optional subjects for Main Examination:

(i) Agriculture
(ii) Animal Husbandry and Veterinary Science
(iii) Anthropology
(iv) Botany
(v) Chemistry
(vi) Civil Engineering
(vii) Commerce and Accountancy
(viii) Economics
(ix) Electrical Engineering
(x) Geography
(xi) Geology
(xii) History
(xiii) Law
(xiv) Management
(xv) Mathematics
(xvi) Mechanical Engineering
(xvii) Medical Science
(xviii) Philosophy
(xix) Physics
(xx) Political Science and International Relations
(xxi) Psychology
(xxii) Public Administration
(xxiii) Sociology
(xxiv) Statistics
(xxv) Zoology
(xxvi) Literature of any one of the following languages:

Assamese, Bengali, Bodo, Dogri, Gujarati, Hindi, Kannada, Kashmiri, Konkani, Maithili, Malayalam, Manipuri, Marathi, Nepali, Odia, Punjabi, Sanskrit, Santhali, Sindhi, Tamil, Telugu, Urdu and English.

Note:

(i) The question papers for the examination will be of conventional (essay) type.

(ii) Each paper will be of three hours duration.

(iii) Candidates will have the option to answer all the question papers, except the Qualifying Language

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Papers, Paper-A and Paper-B, in any one of the languages included in the Eighth Schedule to the Constitution of India or in English. Notwithstanding this, the Candidate will have the choice to write the Optional Papers in English also if candidates opt to write Paper I-V except the Qualifying Language Papers, Paper-A and Paper-B, in any one of the language included in the Eighth Schedule to the Constitution of India.

(iv) Candidates exercising the option to answer Papers in any one of the languages included in the Eight Schedule to the Constitution of India mentioned above may, if they so desire, give English version within brackets of only the description of the technical terms, if any, in addition to the version in the language opted by them. Candidates should, however, note that if they misuse the above rule, a deduction will be made on this account from the total marks otherwise accruing to them and in extreme cases; their script(s) will not be valued for being in an unauthorized medium.

(v) Candidates should note that if any irrelevant matter/signages/marks etc. are found written in the answer script(s), which would not be related to any question/answer and/or would be having the potential to disclose the candidate's identity, the Commission will impose a penalty of deduction of marks from the total marks otherwise accruing to the candidate or will not evaluate the said script(s) on this account.

(vi) The question papers (other than the literature of language papers) will be set in Hindi and English only.

(vii) The details of the syllabi are set out in Part B of Section III.

General Instructions (Preliminary as well as Main Examination):

(i) Candidates must write the papers in their own hand. In no circumstances will they be allowed the help of a scribe to write the answers for them. However, The Persons with Benchmark Disabilities in the categories of blindness, locomotor disability (both arm affected – BA) and cerebral palsy will be eligible for the facility of scribe. In case of other category of Persons with Benchmark Disabilities as defined under section 2 (r) of the RPWD Act, 2016, such candidates will be eligible for the facility of scribe on production of a certificate to the effect that the person concerned has physical limitation to write, and scribe is essential to write examination on behalf, from the Chief Medical Officer/Civil Surgeon/Medical Superintendent of a Government Health Care institution as per proforma at. Appendix-V

Further, for persons with specified disabilities covered under the definition of Section 2(s) of the RPwD Act, 2016 but not covered under the definition of Section 2(r) of the said Act, i.e. persons having less than 40% disability and having difficulty in writing will be eligible for the facility of scribe subject to production of a certificate to the effect that person concerned has limitation to write and that scribe is essential to write examination on his/her behalf from the competent medical authority of a Government healthcare institutio n as per proforma at Appendix-VII.

(ii) The candidates have discretion of opting for their own scribe or request the Commission for the same. The details of scribe i.e. whether own or the Commission's and the details of scribe in case candidates are bringing their own scribe, will be sought at the time of filling up the application form online as per proforma at. Appendix-VI. (for Candidates having 40% disability or more) and Appendix-VIII (for Candidates having less than 40% disability and having difficulty in writing).

(iii) The qualification of the Commission's scribe as well as own scribe will not be more than the minimum qualification criteria of the examination. However, the qualification of the scribe should always be matriculate or above.

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(iv) The Persons with Benchmark Disabilities in the category of blindness, locomotor disability (both arms affected-BA) and cerebral palsy will be eligible for Compensatory Time of twenty minutes per hour of the examination. In case of other categories of Persons with Benchmark Disabilities, such candidates will be eligible for this facility on production of a certificate to the effect that the person concerned has physical limitation to write from the Chief Medical Officer/Civil Surgeon/Medical Superintendent of a Government Health Care institution as per proforma at. Appendix-V

Further, for persons with specified disabilities covered under the definition of Section 2(s) of the RPwD Act, 2016 but not covered under the definition of Section 2(r) of the said Act, i.e. persons having less than 40% disability and having difficulty in writing will be eligible for compensatory time subject to production of a certificate to the effect that person concerned has limitation to write from the competent medical authority of a Government healthcare institution as per proforma at Appendix-VII.

(v) Facility of Scribe and/or Compensatory time to eligible candidates will be provided, if desired by them.

Note (1): The eligibility conditions of a scribe and the conduct of scribe inside the examination hall and the manner in which and extent to which the scribe can help the eligible candidates (as defined above) in writing the Civil Services Examination shall be governed by the instructions issued by the UPSC in this regard. Violation of all or any of the said instructions shall entail the cancellation of the candidature of the candidate in addition to any other action that the UPSC may take against the scribe.

Note (2): The criteria for determining the percentage of visual impairment shall be as follows:—

Better eye Best Corrected	Worse eye Best Corrected	Per Cent Impairment	Disability category
1	2	3	4
6/6 to 6/18	6/6 to 6/18	0%	0
	6/24 to 6/60	10%	0
	Less than 6/60 to 3/60	20%	I
	Less than 3/60 No Light Perception	30%	II (One eyed person)
6/24 to 6/60 Or Visual field less than 40 up to 20 degree around centre of fixation or heminaopia involving macula	6/24 to 6/60	40%	III a (low vision)
	Less than 6/60 to 3/60	50%	III b (low vision)
	Less than 3/60 to No Light Perception	60%	III c (low vision)
Less than 6/60 to 3/60 Or Visual field less than 20 up to 10 degree around centre of fixation	Less than 6/60 to 3/60	70%	III d (low vision)
	Less than 3/60 to No Light Perception	80%	III e (low vision)
Less than 3/60 to 1/60 Or Visual field less than 10 degree around centre of fixation	Less than 3/60 to No Light Perception	90%	IV a (Blindness)
Only HMCF Only Light Perception, No Light perception	Only HMCF Only Light Perception, No Light perception	100%	IV b (Blindness)

Note (3): The concession admissible to blind candidates shall not be admissible to those suffering from Myopia.

(i) The Commission have discretion to fix qualifying marks in any or all the subjects of the examination.

(ii) If a candidate's handwriting is not easily legible, a deduction will be made on this account from the total marks otherwise accruing to the candidate.

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(iii) Marks will not be allotted for mere superficial knowledge.

(iv) Credit will be given for orderly, effective and exact expression combined with due economy of words in all subjects of the examination.

(v) In the question papers, wherever required, SI units will be used.

(vi) Candidates should use only International form of Indian numerals (i.e. 1, 2, 3, 4, 5, 6 etc.) while answering question papers.

(vii) Candidates will be allowed the use of Scientific (Non-Programmable type) Calculators at the conventional (Essay) type examination of UPSC. Programmable type calculators will however not be allowed and the use of such calculators shall tantamount to resorting to unfair means by the candidates. Loaning or interchanging of calculators in the Examination Hall is not permitted. It is also important to note that candidates are not permitted to use calculators for answering objective type papers (Test Booklets). They should not therefore bring the same inside the Examination Hall.

C. Interview/Personality Test

The candidate will be interviewed by a Board who will have before them a record of the candidate's career. The candidate will be asked questions on matters of general interest. The object of the Interview/Personality Test is to assess the personal suitability of the candidate for a career in public service by a Board of competent and unbiased observers. The Interview/Personality Test is intended to judge the mental calibre of a candidate. In broad terms this is really an assessment of not only intellectual qualities but also social traits and interest in current affairs. Some of the qualities to be judged are mental alertness, critical powers of assimilation, clear and logical exposition, balance of judgement, variety and depth of interest, ability for social cohesion and leadership, intellectual and moral integrity.

2. The technique of the Interview/Personality Test is not that of a strict cross-examination but of a natural, though directed and purposive conversation which is intended to reveal the mental qualities of the candidate.

3. The Interview/Personality Test is not intended to be a test either of the specialized or general knowledge of the candidates which has been already tested through their written papers. Candidates are expected to have taken an intelligent interest not only in their special subjects of academic study but also in the events which are happening around them both within and outside their own State or Country as well as in modern currents of thought and in new discoveries which should rouse the curiosity of well-educated youth.

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SECTION III: SYLLABI FOR THE EXAMINATION

Note: Candidates are advised to go through the Syllabus published in this Section for the Preliminary Examination and the Main Examination, as periodic revision of syllabus has been done in several subjects.

Part A—Preliminary Examination

Paper I - (200 marks) **Duration: Two hours**

- Current events of national and international importance.
- History of India and Indian National Movement.
- Indian and World Geography-Physical, Social, Economic Geography of India and the World.
- Indian Polity and Governance-Constitution, Political System, Panchayati Raj, Public Policy, Rights Issues, etc.
- Economic and Social Development-Sustainable Development, Poverty, Inclusion, Demographics, Social Sector Initiatives, etc.
- General issues on Environmental ecology, Bio-diversity and Climate Change - that do not require subject specialization.
- General Science.

Paper II-(200 marks) **Duration: Two hours**

- Comprehension;
- Interpersonal skills including communication skills;
- Logical reasoning and analytical ability;
- Decision making and problem solving;
- General mental ability;
- Basic numeracy (numbers and their relations, orders of magnitude, etc.) (Class X level), Data interpretation (charts, graphs, tables, data sufficiency etc. — Class X level);

Note 1: Paper-II of the Civil Services (Preliminary) Examination will be a qualifying paper with minimum qualifying marks fixed at 33%.

Note 2: The questions will be of multiple choice, objective type.

Note 3: It is mandatory for the candidate to appear in both the Papers of Civil Services (Preliminary) Examination for the purpose of evaluation. Therefore a candidate will be disqualified in case he/she does not appear in both the papers of Civil Services (Preliminary) Examination.

Part B—Main Examination

The main Examination is intended to assess the overall intellectual traits and depth of understanding of candidates rather than merely the range of their information and memory.

The nature and standard of questions in the General Studies papers (Paper II to Paper V) will be such that a well-educated person will be able to answer them without any specialized study. The questions will be such as to test a candidate's general awareness of a variety of subjects, which will have relevance for a career in Civil Services. The questions are likely to test the candidate's basic understanding of all relevant issues, and ability to analyze, and take a view on conflicting socio-economic goals, objectives and demands. The candidates must give relevant, meaningful and succinct answers.

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The scope of the syllabus for optional subject papers (Paper VI and Paper VII) for the examination is broadly of the honours degree 1evel i.e. a level higher than the bachelors' degree and lower than the masters' degree. In the case of Engineering, Medical Science and law, the level corresponds to the bachelors' degree.

Syllabi of the papers included in the scheme of Civil Services (Main) Examination are given as follows:—

QUALIFYING PAPERS ON INDIAN LANGUAGES AND ENGLISH

The aim of the paper is to test the candidates' ability to read and understand serious discursive prose, and to express ideas clearly and correctly, in English and Indian language concerned.

The pattern of questions would be broadly as follows:

(i) Comprehension of given passages.

(ii) Precis Writing.

(iii) Usage and Vocabulary.

(iv) Short Essays.

Indian Languages:—

(i) comprehension of given passages.

(ii) Precis Writing.

(iii) Usage and Vocabulary.

(iv) Short Essays.

(v) Translation from English to the Indian Language and vice-versa.

Note 1: The papers on Indian Languages and English will be of Matriculation or equivalent standard and will be of qualifying nature only. The marks obtained in these papers will not be counted for ranking.

Note 2: The candidates will have to answer the English and Indian Languages papers in English and the respective Indian language (except where translation is involved).

PAPER-I

Essay: Candidates may be required to write essays on multiple topics. They will be expected to keep closely to the subject of the essay to arrange their ideas in orderly fashion, and to write concisely. Credit will be given for effective and exact expression.

PAPER-II

General Studies-I: Indian Heritage and Culture, History and Geography of the World and Society.

- Indian culture will cover the salient aspects of Art Forms, literature and Architecture from ancient to modern times.
- Modern Indian history from about the middle of the eighteenth century until the present- significant events, personalities, issues.
- The Freedom Struggle — its various stages and important contributors/contributions from different parts of the country.
- Post-independence consolidation and reorganization within the country.

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- History of the world will include events from 18th century such as industrial revolution, world wars, redrawal of national boundaries, colonization, decolonization, political philosophies like communism, capitalism, socialism etc.— their forms and effect on the society.
- Salient features of Indian Society, Diversity of India.
- Role of women and women's organization, population and associated issues, poverty and developmental issues, urbanization, their problems and their remedies.
- Effects of globalization on Indian society.
- Social empowerment, communalism, regionalism & secularism.
- Salient features of world's physical geography.
- Distribution of key natural resources across the world (including South Asia and the Indian sub-continent); factors responsible for the location of primary, secondary, and tertiary sector industries in various parts of the world (including India).
- Important Geophysical phenomena such as earthquakes, Tsunami, Volcanic activity, cyclone etc., geographical features and their location-changes in critical geographical features (including water-bodies and ice-caps) and in flora and fauna and the effects of such changes.

PAPER-III

General Studies- II: Governance, Constitution, Polity, Social Justice and International relations.

- Indian Constitution—historical underpinnings, evolution, features, amendments, significant provisions and basic structure.
- Functions and responsibilities of the Union and the States, issues and challenges pertaining to the federal structure, devolution of powers and finances up to local levels and challenges therein.
- Separation of powers between various organs dispute redressal mechanisms and institutions.
- Comparison of the Indian constitutional scheme with that of other countries.
- Parliament and State legislatures—structure, functioning, conduct of business, powers & privileges and issues arising out of these.
- Structure, organization and functioning of the Executive and the Judiciary—Ministries and Departments of the Government; pressure groups and formal/informal associations and their role in the Polity.
- Salient features of the Representation of People's Act.
- Appointment to various Constitutional posts, powers, functions and responsibilities of various Constitutional Bodies.
- Statutory, regulatory and various quasi-judicial bodies.
- Government policies and interventions for development in various sectors and issues arising out of their design and implementation.
- Development processes and the development industry —the role of NGOs, SHGs, various groups and associations, donors, charities, institutional and other stakeholders.
- Welfare schemes for vulnerable sections of the population by the Centre and States and the performance of these schemes; mechanisms, laws, institutions and Bodies constituted for the protection

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and betterment of these vulnerable sections.

- Issues relating to development and management of Social Sector/Services relating to Health, Education, Human Resources.
- Issues relating to poverty and hunger.
- Important aspects of governance, transparency and accountability, e-governance- applications, models, successes, limitations, and potential; citizens charters, transparency & accountability and institutional and other measures.
- Role of civil services in a democracy.
- India and its neighborhood- relations.
- Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.
- Effect of policies and politics of developed and developing countries on India's interests, Indian diaspora.
- Important International institutions, agencies and fora- their structure, mandate.

PAPER-IV

General Studies-III: Technology, Economic Development, Bio diversity, Environment, Security and Disaster Management

- Indian Economy and issues relating to planning, mobilization, of resources, growth, development and employment.
- Inclusive growth and issues arising from it.
- Government Budgeting.
- Major crops-cropping patterns in various parts of the country, - different types of irrigation and irrigation systems storage, transport and marketing of agricultural produce and issues and related constraints; e-technology in the aid of farmers.
- Issues related to direct and indirect farm subsidies and minimum support prices; Public Distribution System- objectives, functioning, limitations, revamping; issues of buffer stocks and food security; Technology missions; economics of animal-rearing.
- Food processing and related industries in India- scope' and significance, location, upstream and downstream requirements, supply chain management.
- Land reforms in India.
- Effects of liberalization on the economy, changes in industrial policy and their effects on industrial growth.
- Infrastructure: Energy, Ports, Roads, Airports, Railways etc.
- Investment models.
- Science and Technology- developments and their applications and effects in everyday life.
- Achievements of Indians in science & technology; indigenization of technology and developing new technology.

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- Awareness in the fields of IT, Space, Computers, robotics, nano-technology, bio-technology and issues relating to intellectual property rights.
- Conservation, environmental pollution and degradation, environmental impact assessment.
- Disaster and disaster management.
- Linkages between development and spread of extremism.
- Role of external state and non-state actors in creating challenges to internal security.
- Challenges to internal security through communication networks, role of media and social networking sites in internal security challenges, basics of cyber security; money-laundering and its prevention.
- Security challenges and their management in border areas - linkages of organized crime with terrorism.
- Various Security forces and agencies and their mandate.

PAPER-V

General Studies- IV: Ethics, Integrity and Aptitude

- This paper will include questions to test the candidates' attitude and approach to issues relating to integrity, probity in public life and his problem solving approach to various issues and conflicts faced by him in dealing with society. Questions may utilise the case study approach to determine these aspects. The following broad areas will be covered:
- Ethics and Human Interface: Essence, determinants and consequences of Ethics in-human actions; dimensions of ethics; ethics - in private and public relationships. Human Values - lessons from the lives and teachings of great leaders, reformers and administrators; role of family society and educational institutions in inculcating values.
- Attitude: content, structure, function; its influence and relation with thought and behaviour; moral and political attitudes; social influence and persuasion.
- Aptitude and foundational values for Civil Service, integrity, impartiality and non-partisanship, objectivity, dedication to public service, empathy, tolerance and compassion towards the weaker-sections.
- Emotional intelligence-concepts, and their utilities and application in administration and governance.
- Contributions of moral thinkers and philosophers from India and world.
- Public/Civil service values and Ethics in Public administration: Status and problems; ethical concerns and dilemmas in government and private institutions; laws, rules, regulations and conscience as sources of ethical guidance; accountability and ethical governance; strengthening of ethical and moral values in governance; ethical issues in international relations and funding; corporate governance.
- Probity in Governance: Concept of public service; Philosophical basis of governance and probity; Information sharing and transparency in government, Right to Information, Codes of Ethics, Codes of Conduct, Citizen's Charters, Work culture, Quality of service delivery, Utilization of public funds, challenges of corruption.
- Case Studies on above issues.

PAPER-VI & PAPER VII

Optional Subject Papers I & II

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Candidate may choose any optional subject from amongst the List of Optional Subjects given in Para 2.

AGRICULTURE

PAPER-I

Ecology and its relevance to man, natural resources, their sustainable management and conservation. Physical and social environment as factors of crop distribution and production. Agro ecology; cropping pattern as indicators of environments. Environmental pollution and associated hazards to crops, animals and humans. Climate change—International conventions and global initiatives. Green house effect and global warming. Advance tools for ecosystem analysis—Remote Sensing (RS) and Geographic Information Systems (GIS).

Cropping patterns in different agro-climatic zones of the country. Impact of high-yielding and short-duration varieties on shifts in cropping patterns. Concepts of various cropping, and farming systems. Organic and Precision farming. Package of practices for production of important cereals, pulses, oil seeds, fibres, sugar, commercial and fodder crops.

Important features, and scope of various types of forestry plantations such as social forestry, agro-forestry, and natural forests: Propagation of forest plants. Forest products. Agro-forestry and value addition. Conservation of forest flora and fauna.

Weeds, their characteristics, dissemination and association with various crops; their multiplications; cultural, biological, and chemical control of weeds.

Soil—physical, chemical and biological properties. Processes and factors of soil formation. soils of India. Mineral and organic constituents of soils and their role in maintaining soil productivity. Essential plant nutrients and other beneficial elements in soils and plants. Principles of soil fertility, soil testing and fertiliser recommendations, integrated nutrient management Biofertilizers. Losses of nitrogen in soil, nitrogen-use efficiency in submerged rice soils, nitrogen fixation in soils. Efficient phosphoruse and potassium use. Problem soils and their reclamation. Soil factors affecting green house gas emission.

Soil conservation, integrated watershed management. Soil erosion and its management. Dry land agriculture and its problems. Technology for stabilising agriculture production in rainfed areas.

Water-use efficiency in relation to crop production, criteria for scheduling irrigations, ways and means of reducing run-off losses of irrigation water. Rainwater harvesting. Drip and sprinkler irrigation. Drainage of water-logged soils, quality of irrigation water, effect of industrial effluents on soil and water pollution. Irrigation projects in India.

Farm management, scope, importance and characteristics, farm planning. Optimum resource use and budgeting. Economics of different types of farming systems. Marketing management strategies for development, market intelligence. price fluctuations and their cost; role of co-operatives in agricultural economy; types and systems of farming and factors affecting them. Agricultural price policy. Crop Insurance.

Agricultural extension, its importance and role, methods of evaluation of extension programmes, socio-economic survey and status of big, small and marginal farmers and landless agricultural labourers; Training programmes for extension workers. Role of Krishi Vigyan Kendra's (KVK) in dissemination of Agricultural technologies. Non-Government Organisation (NGO) and self-help group approach for rural development.

PAPER-II

Cell structure, function and cell cycle. Synthesis, structure and function of genetic material. Laws

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of heredity. Chromosome structure, chromosomal aberrations, linkage and cross-over, and their significance in recombination breeding. Polyploidy, euploids and aneuploids. Mutation—and their role in crop improvement. Heritability, sterility and incompatibility, classification and their application in crop improvement. Cytoplasmic inheritance, sex-linked, sex-influenced and sex-limited characters.

History of plant breeding. Modes of reproduction, selfing and crossing techniques. Origin, evolution and domestication of crop plants, center of origin, law of homologous series, crop genetic resources—conservation and utilization. Application of principles of plant breeding, improvement of crop plants. Molecular markers and their application in plant improvement. Pure-line selection, pedigree, mass and recurrent selections, combining ability, its significance in plant breeding. Heterosis and its exploitation. Somatic hybridization. Breeding for disease and pest resistance. Role of interspecific and intergeneric hybridization. Role of genetic engineering and biotechnology in crop improvement Gernetically modified crop plants.

Seed production and processing technologies. Seed certification, Seed testing and storage. DNA finger printing and seed registration. Role of public and private sectors in seed production, and marketing. Intellectual Property Rights (IPR) issues, WTO issues and its impact on Agriculture.

Principles of Plant Physiology with reference to plant nutrition, absorption, translocation and metabolism of nutrients. Soil-water-plant relationship.

Enzymes and plant pigments; photosynthesis—modern concepts and factors affecting the process, aerobic and anaerobic respiration; C3, C4 and CAM mechanisms. Carbohydrate, protein and fat metabolism. Growth and development; photoperiodism and vernalization. Plant growth substances and their role in crop production. Physiology of seed development and germination; dormancy. Stress physiology—draught, salt and water stress.

major fruits, plantation crops, vegetables, spices and flower crops. package practices of major horticultural crops. Protected cultivation and high tech horticulture. Post-harvest technology and value addition of fruits and vegetables. Landscaping and commercial floriculture. Medicinal and aromatic plants. Role of fruits and vegetables in human nutrition.

Diagnosis of pests and diseases of field crops, vegetables, orchard and plantation crops and their economic importance. Classification of pests and diseases and their management. Intergrated pest and diseases management. Storage pests and their management. Biological control of pests and diseases. Epidemiology and forecasting of major crop pests and diseases. Plant quarantine measures. Pesticides, their formulation and modes of action.

Food production and consumption trends in India. Food security and growing population—vision 2020. Reasons for grain surplus. National and International food policies. Production, procurement, distribution constraints. Availability of foodgtrains, per capita expenditure on food. Trends in poverty, Public Distribution System and Below Poverty Line population, Targeted Public Distribution System (PDS), policy implementation in context to globalization. Processing constraints. Relation of food production to National Dietary Guidelines and food consumption pattern. Food based dietary approaches to eliminate hunger. Nutrient deficiency—Micro nutrient deficiency: Protein Energy Malnutrition or Protein Calorie Malnutrition (PEM or PCM), Micro nutrient deficiency and HRD in context of work capacity of women and children. Food grain productivity and food security.

ANIMAL HUSBANDRY AND VETERINARY SCIENCE

PAPER-I

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1. Animal Nutrition:

1.1 Partitioning of food energy within the animal. Direct and indirect calorimetry. Carbon—nitrogen balance and comparative slaughter methods. Systems for expressing energy value of foods in ruminants, pigs and poultry. Energy requirements for maintenance, growth, pregnancy, lactation, egg, wool, and meat production.

1.2 Latest advances in protein nutrition. Energy protein inter-relationships. Evaluation of protein quality. Use of NPN compounds in ruminant diets. Protein requirements for maintenance, growth, pregnancy, lactation, egg, wool and meat production.

1.3 Major and trace minerals—Their sources, physiological functions and deficiency symptoms. Toxic minerals. Mineral interactions. Role of fatsoluble and water—soluble vitamins in the body, their sources and deficiency symptoms.

1.4 Feed additives—methane inhibitors, probiotics, enzymes, antibiotics, hormones, oligosaccharides, antioxidants, emulsifiers, mould inhibitors, buffers etc. Use and abuse of growth promoters like harmones and antibiotics—latest concepts.

1.5 Conservation of fodders. Storage of feeds and feed ingredients. Recent advances in feed technology and feed processing. Anti-nutritional and toxic factors present in livestock feeds. Feed analysis and quality control. Digestibility trials—direct, indirect and indicator methods. Predicting feed intake in grazing animals.

1.6 Advances in ruminant nutrition. Nutrient requirements. Balanced rations. Feeding of calves, pregnant, work animals and breeding bulls. Strategies for feeding milch animals during different stages of lactation cycle. Effect of feeding on milk composition. Feeding of goats for meat and milk production. Feeding of sheep for meat and wool production.

1.7 Swine Nutrition. Nutrient requirements. Creep, starter, grower and finisher rations. Feeding of pigs for lean meat production. Low cost rations for swine.

1.8 Poultry nutrition. Special features of poultry nutrition. Nutrient requirements for meat and egg production. Formulation of rations for different classes of layers and broilers.

2. Animal Physiology:

2.1 Physiology of blood and its circulation, respiration; excretion. Endocrine glands in health and disease.

2.2 Blood constituents.—Properties and functions-blood cell formation—Haemoglobin synthesis and chemistry-plasma proteins production, classification and properties, coagulation of blood; Haemorrhagic disorders—anti-coagulants—blood groups—Blood volume—Plasma expanders-Buffer systems in blood. Biochemical tests and their significance in disease diagnosis.

2.3 Circulation.—Physiology of heart, cardiac cycle, heart sounds, heart beat, electrocardiograms. Work and efficiency of heart—effect of ions on heart function-metabolism of cardiac muscle, nervous and chemical regulation of heart, effect of temperature and stress on heart, blood pressuer and hypertension, osmotic regulation, arterial pulse, vasomotor regulation of circulation, shock. Coronary and pulmonary circulation, Blood-Brain barrier Cerebrospinal fluid-circulation in birds.

2.4 Respiration.—Mechanism of respiration, Transport and exchange of gases-neural control of respiration-Chemo-receptors-hypoxia-respiration in birds.

2.5 Excretion.—Structure and function of kidney-formation of urine-methods of studying renal function-

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renal regulation of acid-base balance: physiological constituents of urine-renal failure-passive venous congestion-Urinary secretion in chicken-Sweat glands and their function. Bio-chemical test for urinary dysfunction.

2.6 Endocrine glands.—Functional disorders—their symptoms and diagnosis. Synthesis of hormones, mechanism and control of secretion—hormonal receptors-classification and function.

2.7 Growth and Animal Production.—Prenatal and postnatal growth, maturation, growth curves, measures of growth, factors affecting growth, conformation, body composition, meat quality.

2.8 Physiology of Milk Production, Reproduction and Digestion.—Current status of hormonal control of mammary development, milk secretion and milk ejection. Male and Female reproductive organs, their components and functions. Digestive organs and their functions.

2.9 Environmental Physiology.—Physiological relations and their regulation; mechanisms of adaptation, environmental factors and regulatory mechanisms involved in animal behaviour, climatology—various parameters and their importance. Animal ecology. Physiology of behaviour. Effect of stress on health and production.

3. Animal Reproduction:

Semen quality.—Preservation and Artificial Insemination—Components of semen, composition of spermatozoa, chemical and physical properties of ejaculated semen, factors affecting semen in vivo and in vitro. Factors affecting semen production and quality, preservation, composition of diluents, sperm concentration, transport of diluted semen. Deep freezing techniques in cows, sheep, goats, swine and poultry. Detection of oestrus and time of insemination for better conception. Anoestrus and repeat breeding.

4. Livestock Production and Management:

4.1 Commercial Dairy Farming.—Comparison of dairy farming in India with advanced countries. Dairying under mixed farming and as specialized farming, economic dairy farming. Starting of a dairy farm, Capital and land requirement, organization of the dairy farm. Opportunities in dairy farming, factors determining the efficiency of dairy animal. Heard recording, budgeting cost of milk production, pricing policy; Personnel Management. Developing Practical and Economic rations for dairy cattle; supply of greens throughout the year, feed and fodder requirements of Dairy Farm. Feeding regimes for young stock and bulls, heifers and breeding animals; new trends in feeding young and adult stock; Feeding records.

4.2 Commercial meat, egg and wool production.—Development of practical and economic rations for sheep, goats, pigs, rabbits and poultry. Supply of greens, fodder, feeding regimes for young and mature stock. New trends in enhancing production and management. Capital and land requirements and socio-economic concept.

4.3 Feeding and management of animals under drought, flood and other natural calamities.

5. Genetics and Animal Breeding:

5.1 History of animal genetics. Mitosis and Meiosis: Mendelian inheritance; deviations to Mendelian genetics; Expression of genes; Linkage and crossing over; Sex determination, sex influenced and sex limited characters; Blood groups and polymorphism; Chromosome aberrations; Cytoplasmic inheritance, Gene and its structure; DNA as a genetic material; Genetic code and protein synthesis; Recombinant DNA technology. Mutations, types of mutations, methods for detecting mutations and mutation rate, Transgenesis.

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5.2 Population Genetics applied to Animal Breeding—Quantitative Vs. Qualitative traits; Hardy Weinberg Law; Population Vs. Individual; Gene and genotypic frequency; Forces changing gene frequency; Random drift and small populations; Theory of path coefficient; Inbreeding, methods of estimating inbreeding coefficient, systems of inbreeding; Effective population size; Breeding value, estimation of breeding value, dominance and epistatic deviation; Partitioning of variation; Genotype X environment correlation and genotype X environment interaction; role of multiple measurements; Resemblance between relatives.

5.3 Breeding Systems.—Breeds of livestsock and Poultry. Heritability, repeatability and genetic and phenotypic correlations, their methods of estimation and precision of estimates; Aids to selection and their relative merits; Individual, pedigree, family and within family selection; Pregnency testing; Methods of selection; Construction of selection indices and their uses; Comparative evaluation of genetic gains through various selection methods; Indirect selection and correlated response; Inbreeding, out breeding, upgrading, cross-breeding and synthesis of breeds; Crossing of inbred lines for commercial production; Selection for general and specific combining ability; Breeding for threshold characters. Sire index.

6. Extension:

Basic philosophy, objectives, concept and principles of extension. Different Methods adopted to educate farmers under rural conditions. Generation of technology, its transfer and feedback. Problems and constraints in transfer of technology. Animal husbandry programmes for rural development.

PAPER-II

1. Anatomy, Pharmacology and Hygiene:

1.1 **Histology and Histological Techniques :** Paraffin embedding technique of tissue processing and H.E. staining—Freezing microtomy—Microscopy Bright field microscope and electron microscope. Cytology-structure of cell organells and inclusions; cell division-cell types—Tissues and their classification-embryonic and adult tissues—Comparative histology of organs—Vascular, Nervous, digestive, respiratory, musculo-skeletal and urogenital systems—Endocrine glands—Integuments—sense organs.

1.2 **Embryology.**—Embryology of vertebrates with special reference to aves and domestic mammals gametogenesis-fertilization-germ layers-foetal membranes and placentation-types of placenta in domestic mammals-Teratology-twins and twinning-organogenesis-germ layer derivatives-endodermal, mesodermal and ectodermal derivatives.

1.3 **Bovine Anatomy.—**Regional Anatomy : Paranasal sinuses of OX— surface anatomy of salivary glands. Regional anatomy of infraorbital, maxillary, mandi-buloalveolar, mental and cornnal nerve block. Regional anatomy of paravertebral nerves, pudental nerve, median, ulnar and radial nervestibial, fibular and digital nerves—Cranial nerves-structures involved in epidural anaesthesia-superficial lymph nodes-surface anatomy of visceral organs of thoracic, abdominal and pelvic cavities-comparative-features of locomotor apparatus and their application in the biomechanics of mammalian body.

1.4 **Anatomy of Fowl.**—Musculo-skeletal system-functional anatomy in relation to respiration and flying, digestion and egg production.

1.5 **pharmacology and therapeutics drugs.**—Cellular level of pharmacodynamics and

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pharmacokinetics. Drugs acting on fluids and electrolyte balance. Drugs acting on Autonomic nervous system. Modern concepts of anaesthesia and dissociative anaesthetics. Autocoids. Antimicrobials and principles of chemotherapy in microbial infections. Use of hormones in therapeutics—chemotherapy of parasitic infections. Drug and economic concerns in the Edible tissues of animals—chemotherapy of Neoplastic diseases. Toxicity due to "insecticides, plants, metals, non-metals, zootoxins and mycotoxins".

1.6 **Veterinary Hygiene with reference to water, air and habitation.**—Assessment of pollution of water, air and soil—Importance of climate in animal health—effect of environment on animal function and performance relationship between industrialisation and animal agriculture—animal housing requirements for specific categories of domestic animals viz. pregnant cows and sows, milking cows, broiler birds—stress, strain and productivity in relation to animal habitation.

2. Animal Diseases :

2.1 Etiology, epidemiology pathogenesis, symptoms, post-moretem lesions, diagnosis, and control of infectious diseases of cattle, sheep and goat, horses, pigs and poultry.

2.2 Etiology, epidemiology, symptoms, diagnosis, treatment of production diseases of cattle, horse, pig and poultry.

2.3 Deficiency diseases of domestic animals and birds.

2.4 Diagnosis and treatment of non-specific conditions like impaction, Bloat, Diarrhoea, Indigestion, dehydration, stroke, poisioning.

2.5 Diagnosis and treatment of neurological disorders.

2.6 **Principles and methods of immunisation of animals against specific diseases—hard immunity**—disease free zones—'zero' disease concept—chemoprophylaxis.

2.7 **Anaesthesia.**—local, regional and general-prenesthetic medication. Symptoms and surgical interference in fractures and dislocation. Hernia, choking abomassal displacement—Caesarian operations. Rumenotomy—Castrations.

2.8 **Disease investigation techniques.**—Materials for laboratory investigation—Establishment. Animal Health Centres—Disease free zone.

3. Veterinary Public Health :

3.1 **Zoonoses.**—Classification, definition, role of animals and birds in prevalence and transmission of zoonotic diseases—occupational zoonotic diseases.

3.2 **Epidemiology.**—Principle, definition of epidemiological terms, application of epidemiological measures in the study of diseases and disease control. Epidemiological features of air, water and food borne infections. OIE regulation, WTO, sanitary and phytosanitary measures.

3.3 **Veterinary Jurisprudence.**—Rules and Regulations for improvement of animal quality and prevention of animal diseases—State and Central Rules for prevention of animal and animal product borne diseases—S.P. C.A.—Veterolegal cases—Certificates—Materials and Methods of collection of samples for veterolegal investigation.

4. Milk and Milk Products Technology :

4.1 **Market Milk.**—Quality, testing and grading of raw milk. Processing, packaging, storing, distribution, marketing defects and their control. Preparation of the following milks : Pasteurized, standardized,

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toned, double toned, sterilized, homogenized, reconstituted, recombined and flavoured milks. Preparation of cultured milks, cultures and their management, yoghurt, Dahi, Lassi and Srikhand. Preparation of flavoured and sterilized milks. Legal standards. Sanitation requirement for clean and safe milk and for the milk plant equipment.

4.2 **Milk Products Technology.**—Selection of raw materials, processing, storing, distributing and marketing milk products such as Cream, Butter, Ghee, Khoa, Channa, Cheese, condensed, evaporated, dried milk and baby food, Ice cream and Kulfi; by-products, whey products, butter milk, lactose and casein. Testing, grading, judging milk products—BIS and Agmark specifications, legal standards, quality control nutritive properties. Packaging processing and operational control. Costing of dairy products.

5. Meat Hygiene and Technology :

5.1 **Meat Hygiene**

5.1.1 Ante mortem care and management of food animals, stunning, slaughter and dressing operations; abattoir requirements and designs; Meat inspection procedures and judgement of carcass meat cuts—grading of carcass meat cuts—duties and functions of Veterinarians in wholesome meat production.

5.1.2 **Hygienic methods of handling production of meat.**—Spoilage of meat and control measures—Post- slaughter physicochemical changes in meat and factors that influence them—Quality improvement methods—Adulteration of meat and detection—Regulatory provisions in Meat trade and Industry.

5.2 **Meat Technology**

5.2.1 **Physical and chemical characteristics of meat.**—Meat emulsions—Methods of preservation of meat—Curing, canning, irradiation, packaging of meat and meat products, processing and formulations.

5.3 **By-products.**—Slaughter house by-products and their utilisation—Edible and inedible by products—Social and economic implications of proper utilisation of slaughter house by-products—Organ products for food and pharmaceuticals.

5.4 **Poultry Products Technology.**—Chemical composition and nutritive value of poultry meat, pre-slaughter care and management. Slaughtering techniques, inspection, preservation of poultry meat and products. Legal and BIS standards.

Structure composition and nutritive value of eggs Microbial spoilage. Preservation and maintenance. Marketing of poultry meat, eggs and products.

5.5 **Rabbit/Fur Animal farming.**—Rabbit meat production. Disposal and utilization of fur and wool and recycling of waste by products. Grading of wool.

ANTHROPOLOGY

PAPER-I

1.1 Meaning, Scope and development of Anthropology.

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1.2 Relationships with other disciplines : Social Sciences, behavioural Sciences, Life Sciences, Medical Sciences, Earth Sciences and Humanities.

1.3 Main branches of Anthropology, their scope and relevance :

(a) Social-cultural Anthropology.

(b) biological Anthropology.

(c) Archaeological Anthropology.

(d) Linguistic Anthropology.

1.4 Human Evolution and emergence of Man :

(a) Biological and Cultural factors in human evolution.

(b) Theories of Organic Evolution (Pre-Darwinian, Darwinian and Post-Darwinian).

(c) Synthetic theory of evolution; Brief outline of terms and concepts of evolutionary biology (Doll's rule, Cope's rule, Gause's rule, parallelism, convergence, adaptive radiation, and mosaic evolution).

1.5 Characteristics of Primates; Evolutionary Trend and Primate Taxonomy; Primate Adaptations; (Arboreal and Terrestrial) Primate Taxonomy; Primate Behaviour; Tertiary and Quaternary fossil primates; Living Major Primates; Comparative Anatomy of Man and Apes; Skeletal changes due to erect posture and its implications.

1.6 Phylogenetic status, characteristics and geographical distribution of the following :

(a) Plio-preleistocene hominids inSouth and East Africa—Australopithecines.

(b) *Homo erectus : Africa (Paranthropus)*, Europe *(Homo erectus (heidelbergensis)*, Asia *(Homo erectus javanicus, Homo erectus pekinensis*.

(c) Neanderthal man—La-chapelle-aux-saints (Classical type), Mt. Carmel (Progressive type).

(d) Rhodesian man.

(e) *Homo sapiens*—Cromagnon, Grimaldi and Chancelede.

1.7 The biological basis of Life : The Cell, DNA structure and replication, Protein Synthesis, Gene, Mutation, Chromosomes, and Cell Division.

1.8 (a) Principles of Prehistoric Archaeology. Chronology : Relative and Absolute Dating methods.

(b) Cultural Evolution—Broad Outlines of Prehistoric cultures :

(i) Paleolithic

(ii) Mesolithic

(iii) Neolithic

(iv) Chalcolithic

(v) Copper-Bronze age

(vi) Iron Age

2.1 **The Nature of Culture :** The concept and Characteristics of culture and civilization; Ethnocentrism vis-a-vis cultural Relativism.

2.2 **The Nature of Society :** Concept of Society; Society and Culture; Social Institution; Social groups;

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and Social stratification.

2.3 **Marriage :** Definition and universality; Laws of marriage (endogamy, exogamy, hypergamy, hypogamy, incest taboo); Type of marriage (monogamy, polygamy, polyandry, group marriage). Functions of marriage; Marriage regulations (preferential, prescriptive and proscriptive); Marriage payments (bride wealth and dowry).

2.4 **Family :** Definition and universality; Family, household and domestic groups; functions of family; Types of family (from the perspectives of structure, blood relation, marriage, residence and succession); Impact of urbanization, industrialization and feminist movements on family.

2.5 **Kinship :** Consanguinity and Affinity; Principles and types of descent (Unilineal, Double, Bilateral Ambilineal); Forms of descent groups (lineage, clan, phratry, moiety and kindred); Kinship terminology (descriptive and classificatory); Descent, Filiation and Complimentary Filiation;Decent and Alliance.

3. **Economic Organization :** Meaning, scope and relevance of economic anthropology; Formalist and Substantivist debate; Principles governing production, distribution and exchange (reciprocity, redistribution and market), in communities, subsisting on hunting and gathering, fishing, swiddening, pastoralism, horticulture, and agriculture; globalization and indigenous economic systems.

4. **Political Organization and Social Control :** Band, tribe, chiefdom, kingdom and state; concepts of power, authority and legitimacy; social control, law and justice in simple Societies.

5. **Religion :** Anthropological approaches to the study of religion (evolutionary, psychological and functional); monotheism and polytheism; sacred and profane; myths and rituals; forms of religion in tribal and peasant Societies (animism, animatism, fetishism, naturism and totemism); religion, magic and science distinguished; magico-religious functionaries (priest, shaman, medicine man, sorcerer and witch).

6. **Anthropological theories :**

(a) Classical evolutionism (Tylor, Morgan and Frazer)

(b) Historical particularism (Boas) Diffusionism (British, German and American)

(c) Functionalism (Malinowski); Structural—Functionlism (Radcliffe-Brown)

(d) Structuralism (L'evi-Strauss and E. Leach)

(e) Culture and personality (Benedict, Mead, Linton, Kardiner and Cora-du Bois)

(f) Neo—evolutionism (Childe, White, Steward, Sahlins and Service)

(g) Cultural materialism (Harris)

(h) Symbolic and interpretive theories (Turner, Schneider and Geertz)

(i) Cognitive theories (Tyler, Conklin)

(j) Post-modernism in anthropology.

7. **Culture, Language and Communication :**

Nature, origin and characteristics of language; verbal and non-verbal communication; social contex of language use.

8. **Research methods in Anthropology :**

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(a) Fieldwork tradition in anthropology

(b) Distinction between technique, method and methodology

(c) Tools of data collection : observation, interview, schedules, questionnaire, case study, genealogy, life-history, oral history, secondary sources of information, participatory methods.

(d) Analysis, interpretation and presentation of data.

9.1 **Human Genetics :** Methods and Application : Methods for study of genetic principles in man-family study (pedigree analysis, twin study, foster child, co-twin method, cytogenetic method, chromosomal and karyo-type analysis), biochemical methods, immunological methods, D.N.A. technology and recombinant technologies.

9.2 Mendelian genetics in man-family study, single factor, multifactor, lethal, sub-lethal and polygenic inheritance in man.

9.3 Concept of genetic polymorphism and selection, Mendelian population, Hardy-Weinberg law; causes and changes which bring down frequency-mutation, isolation, migration, selection, inbreeding and genetic drift. Consanguineous and non-consanguineous mating, genetic load, genetic effect of consanguineous and cousin marriages.

9.4 Chromosomes and chromosomal aberrations in man, methodology.

(a) Numerical and structural aberrations (disorders).

(b) Sex chromosomal aberration- Klinefelter (XXY), Turner (XO), Super female (XXX), intersex and other syndromic disorders.

(c) Autosomal aberrations- Down syndrome, Patau, Edward and Cri-du-chat syndromes.

(d) Genetic imprints in human disease, genetic screening, genetic counseling, human DNA profiling, gene mapping and genome study.

9.5 Race and racism, biological basis of morphological variation of non-metric and characters. Racial criteria, racial traits in relation to heredity and environment; biological basis of racial classification, racial differentiation and race crossing in man.

9.6 **Age, sex and population variation as genetic marker :**ABO, Rh blood groups, HLA Hp, transferring, Gm, blood enzymes. Physiological characteristics-Hb level, body fat, pulse rate, respiratory functions and sensory perceptions in different cultural and socio-ecomomic groups.

9.7 **Concepts and methods of Ecological Anthropology :** Bio-cultural Adaptations—Genetic and Non-genetic factors. Man's physiological responses to environmental stresses: hot desert, cold, high altitude climate.

9.8 **Epidemiological Anthropology :** Health and disease. Infectious and non-infectious diseases, Nutritional deficiency related diseases.

10. **Concept of human growth and Development :** Stages of growth—pre-natal, natal, infant, childhood, adolescence, maturity, senescence.

—Factors affecting growth and development genetic, environmental, biochemical, nutritional, cultural and socio-economic.

—Ageing and senescence. Theories and observations

—biological and chronological longevity. Human physique and somatotypes. Methodologies for growth studies.

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11.1 Relevance of menarche, menopause and other bioevents to fertility. Fertility patterns and differentials.

11.2 Demographic theories-biological, social and cultural.

11.3 Biological and socio-ecological factors influencing fecundity, fertility, natality and mortality.

12. **Applications of Anthropology :** Anthropology of sports, Nutritional anthropology, Anthroplogy in designing of defence and other equipments, Forensic Anthroplogy, Methods and principles of personal identification and reconstruction, Applied human genetics—Paternity diagnosis, genetic counselling and eugenics, DNA technology in diseases and medicine, serogenetics and cytogenetics in reproductive biology.

PAPER-II

1.1 **Evolution of the Indian Culture and Civilization—**Prehistoric (Palaeolithic, Mesolithic, Neolithic and Neolithic-Chalcolithic), Protohistoric (Indus Civilization). Pre-Harappan, Harappan and post-Harappan cultures. Contributions of the tribal cultures to Indian civilization.

1.2 **Palaeo—**Anthropological evidences from India with special reference to Siwaliks and Narmada basin (*Ramapithecus, Sivapithecus and Narmada Man*).

1.3. **Ethno-archaeology in India:** The concept of ethno-archaeology; Survivals and Parallels among the hunting, foraging, fishing, pastoral and peasant communities including arts and crafts producing communities.

2. **Demographic profile of India—**Ethnic and linguistic elements in the Indian population and their distribution. Indian population—factors influencing its structure and growth.

3.1 The structure and nature of traditional Indian social system—Varnashram, Purushartha, Karma, Rina and Rebirth.

3.2 **Caste system in India—** Structure and characteristics Varna and caste, Theories of origin of caste system, Dominant caste, Caste mobility, Future of caste system, Jajmani system. Tribe-case continuum.

3.3 Sacred Complex and Nature-Man-Spirit Complex.

3.4. Impact of Buddhism, Jainism, Islam and Christianity of Indian society.

4. Emergence, growth and development in India—Contributions of the 18th, 19th and early 20th Century scholar-administrators. Contributions of Indian anthropologists to tribal and caste studies.

5.1 **Indian Village—**Significane of village study in India; Indian village as a social system; Traditional and changing patterns of settlement and inter-caste relations; Agrarian relations in Indian villages; Impact of globalization on Indian villages.

5.2 Linguistic and religious minorities and their social, political and economic status.

5.3 Indigenous and exogenous processes of socio-cultural change in Indian society: Sanskritization, Westernization, Modernization; Inter-play of little and great traditions; Panchayati Raj and social change; Media and Social change.

6.1 Tribal situation in India—Bio-genetic variability, linguistic and socio-economic characteristics of the tribal populations and their distribution.

6.2 **Problems of the tribal Communities—**Land alienation, poverty, indebtedness, low literacy, poor educational facilities, unemployment, under- employment, health and nutrition.

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6.3 Developmental projects and their impact on tribal displacement and problems of rehabilitation. Development of forest policy and tribals. Impact of urbanisation and industrialization on tribal populations.

7.1 Problems of exploitation and deprivation of Scheduled Castes, Scheduled Tribes and Other Backward Classes. Constitutional safeguards for Scheduled Tribes and Scheduled Castes.

7.2 Social change and contemporary tribal societies : Impact of modern democratic institutions, development programmes and welfare measures on tribals and weaker sections.

7.3 The concept of ethnicity; Ethnic conflicts and political developments; Unrest among tribal communities; Regionalism and demand for autonomy; Pseudo-tribalism. Social change among the tribes during colonial and post-Independent India.

8.1 Impact of Hinduism, Buddhism, Christianity, Islam and other religions on tribal societies.

8.2 Tribe and nation state—a comparative study of tribal communities in India and other countries.

9.1 History of administration of tribal areas, tribal policies, plans, programmes of tribal development and their implementation. The concept of PTGs (Primitive Tribal Groups), their distribution, special programmes for their development. Role of N.G.O.s in tribal development.

9.2 Role of anthropology in tribal and rural development.

9.3 Contributions of anthropology to the understanding of regionalism, communalism and ethnic and political movements.

BOTANY

PAPER-I

1. **Microbiology and Plant Pathology :**

Structure and reproduction/multiplication of viruses,viroids, bacteria, fungi and mycoplasma; Applications of microbiology in agriculture, industry, medicine and in control of soil and water pollution; Prion and Prion hypothesis.

Important crop diseases caused by viruses, bacteria, mycoplasma, fungi and nematodes; Modes of infection and dissemination; Molecular basis of infection and disease resistance/defence; Physiology of parasitism and control measures. Fungal toxins. Modelling and disease forecasting; Plant quarantine.

2. **Cryptogams :**

Algae, fungi, lichens, bryophytes, pteridophytes-structure and reproduction from evolutionary viewpoint; Distribution of Cryptogams in India and their ecological and economic importance.

3. **Phanerogams :**

Gymnosperms : Concept of Progymnosperms. Classification and distribution of gymnosperms. Salient features of Cycadales, Ginkgoales, Coniferales and Gnetales, their structure and reproduction. General account of Cycadofilicales, Bennettitales and Cordiaitailes; Geological time scale; Type of fossils and their study techniques.

Angiosperms : Systematics, anatomy, embryology, palynology and phylogency.

Taxonomic hierarchy; International Code of Botanical Nomenclature; Numerical taxomomy and chemotaxomomy; Evidence from anatomy, embryology and palynology.

Origin and evolution of angiosperms; Comparative account of various systems of classification of

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angiosperms; Study of angiospermic families— Mangnoliaceae, Ranunculaceae, Brassicaceae, Rosaceae, Fabaceae, Euphorbiaceae, Malvaceae, Dipterocarpaceae, Apiaceae, Asclepiadaceae, Verbenaceae, Solanaceae, Rubiaceae, Cucurbitaceae, Asteraceae, Poaceae, Arecaceae, Liliaceae, Musaceae and Orchidaceae.

Stomata and their types; Glandular and non-glandular trichomes; Unusual secondary growth; Anatomy of C_3 and C_4 plants; Xylem and phloem differentiation; Wood anatomy.

Development of male and female gametophytes, pollination, fertilization; Endosperm—its development and function. Patterns of embryo development; Polyembroyony, apomixes; Applications of palynology; Experimental embryology including pollen storage and test-tube fertilization.

4. **Plant Resource Development :**

Domestication and introduction of plants; Origin of cultivated plants, Vavilov's centres of origin. Plants as sources for food, fodder, fibres, spices, beverages, edible oils, drugs, narcotics, insecticides, timber, gums, resins and dyes; latex, cellulose, starch and its products; Perfumery; Importance of Ethnobotany in Indian context; Energy plantations; Botanical Gardens and Herbaria.

5. **Morphogenesis :**

Totipotency, polarity, symmetry and differentiation; Cell, tissue, organ and protoplast culture. Somatic hybrids and Cybrids; Micropropagation; Somaclonal variation and its applications; Pollen haploids, embryo rescue methods and their applications.

PAPER-II

1. Cell Biology :

Techniques of cell biology. Prokaryotic and eukaryotic cells—structural and ultrastructural details; Structure and function of extracellular matrix (cell wall) and membranes-cell adhesion, membrane transport and vesicular transport; Structure and function of cell organelles (chloroplasts, mitochondria, ER, dictyosomes ribosomes, endosomes,lysosomes, peroxisomes; Cytoskelaton and microtubules; Nucleus, nucleolus, nuclear pore complex; Chromatin and nucleosome; Cell signalling and cell receptors; Signal transduction Mitosis and meiosis; molecular basis of cell cycle. Numerical and structural variations in chromosomes and their significance; Chromatin organization and packaging of genome; Polytene chromosomes; B-chromosomes—structure, behaviour and significance.

2. Genetics, Molecular Biology and Evolution :

Development of genetics, and gene versus allele concepts (Pseudoalleles); Quantitative genetics and multiple factors; Incomplete dominance, polygenic inheritance, multiple alleles; Linkage and crossing over of gene mapping including molecular maps (idea of mapping, function); Sex chromosomes and sex-linked inheritance; sex determination and molecular basis of sex differentiation; Mutations (biochemical and molecular basis); Cytoplasmic inheritance and cytoplasmic genes (including genetics of male sterility).

Structure and synthesis of nucleic acids and proteins; Genetic code and regulation of gene expression; Gene silencing; Multigene families; Organic evolution-evidences, mechanism and theories.

Role of RNA in origin and evolution.

3. Plant Breeding, Biotechnology and Biostatistics :

Methods of plant breeding—introduction, selection and hybridization (pedigree, backcross, mass selection, bulk method); Mutation, polyploidy, male sterility and heterosis breeding. Use of apomixes in plant breeding; DNA sequencing; Genetic engineering—methods of transfer of genes; Transgenic crops and

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biosafety aspects; Development and use of molecular markers in plant breeding; Tools and techniques—probe, southern blotting, DNA fingerprinting, PCR and FISH. Standard deviation and coefficient of variation (CV). Tests of significance (Z-test, t-test and chi-square tests). Probability and distributions (normal, binomial and Poisson). Correlation and regression.

4. Physiology and Biochemistry :

Water relations, mineral nutrition and ion transport, mineral deficiencies. Photosynthesis—photochemical reactions, photophosphorylation and carbon fixation pathways; C_3, C_4 and CAM pathways; Mechanism of pholem transport, Respiration (anerobic and aerobic, including fermentation)—electron transport chain and oxidative phosphorylation; Photorespiration; Chemiosmotic theory and ATP synthesis; Lipid metabolism; Nitrogen fixation and nitrogen metabolism. Enzymes, coenzymes; Energy transfer and energy conservation. Importance of secondary metabolites. Pigments as photoreceptors (plastidial pigments and phytochrome). Plant movements; Photoperiodism and flowering, vernalization, senescence; Growth substances—their chemical nature, role and applications in agri-horticulture; growth indices, growth movements. Stress physiology (heat, water, salinity, metal); Fruit and seed physiology. Dormancy, storage and germination of seed. Fruit ripening—its molecular basis and manipulation.

5. Ecology and Plant Geography :

Concept of ecosystem; Ecological factors. Concepts and dynamics of community; Plant succession. Concepts of biosphere; Ecosystems; Conservation; Pollution and its control (including phytoreme-diation); Plant indicators; Environment (Protection) Act.

Forest types of India—'Ecological and ecomomic importance of forests, afforestation, deforestation and social forestry; Endangered plants, endemism IUCN categories, Red Data Books; Biodiversity and its conservation; Protected Area Network; Convention of Biological Diversity, Farmers' Rights; and Intellectual Property Rights; Concept of Sustainable Development; Biogeochemical cycles. Global warming and climatic change; Invasive species; Environmetal Impact Assessment; Phytogeographical regions of India.

CHEMISTRY

PAPER-I

1. **Atomic Structure :**

Heisenberg's uncertainty principle Schrodinger wave equation (time independent); Interpretation of wave function, particle in one- dimensional box, quantum numbers, hydrogen atom wave functions; Shapes of s, p and d orbitals.

2. Chemical bonding :

Ionic bond, characteristics of ionic compounds, lattice energy, Born-Haber cycle; covalent bond and its general characteristics, polarities of bonds in molecules and their dipole moments; Valence bond theory, concept of resonance and resonance energy; Molecular orbital theory (LCAO method); bonding H2 +, H2 He2 + to Ne2, NO, CO, HF, CN–, Comparison of valence bond and molecular orbital theories, bond order, bond strength and bond length.

3. Solid state :

Crystal systems; Designation of crystal faces, lattice structures and unit cell; Bragg's law; X-ray diffraction by crystals; Close packing, radius ratio rules, calculation of some limiting radius ratio values; Structures of NaCl, ZnS, CsCl, CaF2; stoichiometric and nonstoichiometric defects, impurity defects, semi-

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conductors.

4. The gaseous state and Transport Phenomenon :

Equation of state for real gases, intermolecular interactions, and critical phenomena and liquefaction of gases; Maxwell's distribution of speeds, intermolecular collisions, collisions on the wall and effusion; Thermal conductivity and viscosity of ideal gases.

5. Liquid State :

Kelvin equation; Surface tension and surface enercy, wetting and contact angle, interfacial tension and capillary action.

6. Thermodynamics :

Work, heat and internal energy; first law of thermodynamics.

Second law of thermodynamics; entropy as a state function, entropy changes in various processes, entropy-reversibility and irreversibility, Free energy functions; Thermodynamic equation of state; Maxwell relations; Temperature, volume and pressure dependence of U, H, A, G, Cp and Cv, □□and□□ ; J-T effect and inversion temperature; criteria for equilibrium, relation between equilibrium constant and thermodynamic quantities; Nernst heat theorem, introductory idea of third law of thermodynamics.

7. Phase equilibria and solutions :

Clausius-Clapeyron equation; phase diagram for a pure substance; phase equilibria in binary systems, partially miscible liquids—upper and lower critical solution temperatures; partial molar quantities, their significance and determination; excess thermodynamic functions and their determination.

8. Electrochemistry :

Debye-Huckel theory of strong electrolytes and Debye-Huckel limiting Law for various equilibrium and transport properties.

Galvanic cells, concentration cells; electrochemical series, measurement of e.m.f. of cells and its applications fuel cells and batteries.

Processes at electrodes; double layer at the interface; rate of charge transfer, current density; overpotential; electroanalytical techniques : amperometry, ion selective electrodes and their use.

9. Chemical kinetics:

Differential and integral rate equations for zeroth, first, second and fractional order reactions; Rate equations involving reverse, parallel, consecutive and chain reactions; Branching chain and explosions; effect of temperature and pressure on rate constant. Study of fast reactions by stop-flow and relaxation methods. Collisions and transition state theories.

10. Photochemistry:

Absorption of light; decay of excited state by different routes; photochemical reactions between hydrogen and halogens and their quantum yields.

11. Surface phenomena and catalysis:

Adsorption from gases and solutions on solid adsorbents; Langmuir and B.E.T. adsorption isotherms; determination of surface area, characteristics and mechanism of reaction on heterogeneous catalysts.

12. Bio-inorganic chemistry:

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Metal ions in biological systems and their role in ion-transport across the membranes (molecular mechanism), oxygen-uptake proteins, cytochromes and ferrodoxins.

13. Coordination chemistry :

(i) Bonding in transition of metal complexes. Valence bond theory, crystal field theory and its modifications; applications of theories in the explanation of magnetism and elctronic spectra of metal complexes.

(ii) Isomerism in coordination compounds; IUPAC nomenclature of coordination compounds; stereochemistry of complexes with 4 and 6 coordination numbers; chelate effect and polynuclear complexes; trans effect and its theories; kinetics of substitution reactions in square-planar complexes; thermodynamic and kinetic stability of complexes.

(iii) EAN rule, Synthesis structure and reactivity of metal carbonyls; carboxylate anions, carbonyl hydrides and metal nitrosyl compounds.

(iv) Complexes with aromatic systems, synthesis, structure and bonding in metal olefin complexes, alkyne complexes and cyclopentadienyl complexes; coordinative unsaturation, oxidative addition reactions, insertion reactions, fluxional molecules and their characterization; Compounds with metal—metal bonds and metal atom clusters.

14. Main Group Chemistry:

Boranes, borazines, phosphazenes and cyclic phosphazene, silicates and silicones, Interhalogen compounds; Sulphur—nitrogen compounds, noble gas compounds.

15. General Chemistry of 'f' Block Element:

Lanthanides and actinides: separation, oxidation states, magnetic and spectral properties; lanthanide contraction.

PAPER-II

1. Delocalised covalent bonding :

Aromaticity, anti-aromaticity; annulenes, azulenes, tropolones, fulvenes, sydnones.

2. (i) **Reaction mechanisms :** General methods (both kinetic and non-kinetic) of study of mechanisms or organic reactions : isotopies, mathod cross-over experiment, intermediate trapping, stereochemistry; energy of activation; thermodynamic control and kinetic control of reactions.

(ii) **Reactive intermediates :** Generation, geometry, stability and reactions of carboniumions and carbanions, free radicals, carbenes, benzynes and nitrenes.

(iii) **Substitution reactions :—**S_N 1, S_N 2, and S_N i, mechanisms ; neighbouring group participation; electrophilic and nucleophilic reactions of aromatic compounds including heterocyclic compounds—pyrrole, furan, thiophene and indole.

(iv) **Elimination reactions :—**E1, E2 and E1cb mechanisms; orientation in E2 reactions—Saytzeff and Hoffmann; pyrolytic *syn* elimination—acetate pyrolysis, Chugaev and Cope eliminations.

(v) **Addition reactions :—**Electrophilic addition to C=C and C□C; nucleophilic addition to C=O, C□N, conjugated olefins and carbonyls.

(vi) **Reactions and Rearrangements :—**(a) Pinacol-pinacolone, Hoffmann, Beckmann, Baeyer-Villiger, Favorskii, Fries, Claisen, Cope, Stevens and Wagner—Meerwein rearrangements.

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(b) Aldol condensation, Claisen condensation, Dieckmann, Perkin, Knoevenagel, Witting, Clemmensen, Wolff-Kishner, Cannizzaro and von Richter reactions; Stobbe, benzoin and acyloin condensations; Fischer indole synthesis, Skraup synthesis, Bischler-Napieralski, Sandmeyer, Reimer-Tiemann and Reformatsky reactions.

3. **Pericyclic reactions :—**Classification and examples; Woodward-Hoffmann rules—electrocyclic reactions, cycloaddition reactions [2+2 and 4+2] and sigmatropic shifts [1, 3; 3, 3 and 1, 5], FMO approach.

4. **(i) Preparation and Properties of Polymers:** Organic polymerspolyethylene, polystyrene, polyvinyl chloride, teflon, nylon, terylene, synthetic and natural rubber.

(ii) Biopolymers: Structure of proteins, DNA and RNA.

5. **Synthetic Uses of Reagents:**

OsO_4, HIO_4, CrO_3, $Pb(OAc)_4$, SeO_2, NBS, B_2H_6, Na-Liquid NH_3, $LiAlH_4$, $NaBH_4$, n-BuLi, MCPBA.

6. **Photochemistry :—**Photochemical reactions of simple organic compounds, excited and ground states, singlet and triplet states, Norrish-Type I and Type II reactions.

7. **Spectroscopy:**

Principle and applications in structure elucidation :

(i) **Rotational—**Diatomic molecules; isotopic substitution and rotational constants.

(ii) **Vibrational—**Diatomic molecules, linear triatomic molecules, specific frequencies of functional groups in polyatomic molecules.

(iii) **Electronic—**Singlet and triplet states. $n \rightarrow \pi^*$ and $\pi \rightarrow \pi^*$ transitions; application to conjugated double bonds and conjugated carbonyls Woodward-Fieser rules; Charge transfer spectra.

(iv) **Nuclear Magnetic Resonance (^{1}HNMR):** Basic principle; chemical shift and spin-spin interaction and coupling constants.

(v) **Mass Spectrometry :—**Parent peak, base peak, metastable peak, McLafferty rearrangement.

CIVIL ENGINEERING

PAPER-I

1. **Engineering Mechanics, Strength of Materials and Structural Analysis.**

1.1 **Engineering Mechanics :**

Units and Dimensions, SI Units, Vectors, Concept of Force, Concept of particle and rigid body. Concurrent, Non- Concurrent and parallel forces in a plane, moment of force free body diagram, conditions of equilibrium, Principle of virtual work, equivalent force system.

First and Second Moment of area, Mass moment of Inertia.

Static Friction.

Kinematics and Kinetics:

Kinematics in cartesian Co-ordinates, motion under uniform and non-uniform acceleration, motion under gravity. Kinetics of particle : Momentum and Energy principles, collision of elastic bodies, rotation of rigid bodies.

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1.2 Strength of Materials :

Simple Stress and Strain, Elastic constants, axially loaded compression members, Shear force and bending moment, theory of simple bending, Shear Stress distribution across cross sections, Beams of uniform strength.

Deflection of beams: Mecaulay's method, Mohr's Moment area method, Conjugate beam method, unit load method. Torsion of Shafts, Elastic stability of columns, Euler's, Rankine's and Secant formulae.

1.3 Structural Analysis :

Castiglianio's theorems I and II, unit load method, of consistent deformation applied to beams and pin jointed trusses. Slope-deflection, moment distribution.

Rolling loads and Influences lines : Influences lines for Shear Force and Bending moment at a section of a beam. Criteria for maximum shear force and bending Moment in beams traversed by a system of moving loads. Influences lines for simply supported plane pin jointed trusses.

Arches : Three hinged, two hinged and fixed arches, rib shortening and temperature effects.

Matrix mehods of analysis : Force method and displacement method of analysis of indeterminate beams and rigid frames.

Plastic Analysis of beams and frames : Theory of plastic bending, plastic analysis, statical method, Mechanism method.

Unsymmetrical bending : Moment of inertia, product of inertia, position of Neutral Axis and Principal axes, calculation of bending stresses.

2. Design of Structures : Steel, concrete and masonry structures.

2.1 Structural Steel Design :

Structural steel : Factors of safety and load factors. Riveted, bolted and welded joints and connections. Design of tension and compression members, beams of built up section, riveted and welded plate girders, gantry girders, stancheons with battens and lacings.

2.2 Design of Concrete and Masonry Structures :

Concept of mix design. Reinforced Concrete : Working Stress and Limit State method of design—Recommendations of I. S. codes. design of one way and two way slabs, stair-case slabs, simple and continuous beams of rectangular, T and L sections. compression members under direct load with or without eccentricity.

Cantilever and Counter fort type retaining walls.

Water tanks : Design requirements for Rectangular and circular tanks resting on ground.

Prestressed Concrete : Methods and systems of prestressing, anchorages, Analysis and design of sections for flexure based on working stress, loss of prestress.

Design of brick masonry as per I. S. Codes

3. Fluid Mechanics, open channel flow and Hydraulic Machines :

3.1 Fluid Mechanics :

Fluid properties and their role in fluid motion, fluid statics including forces acting on plane and curve surfaces.

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Kinematics and Dynamics of Fluid flow : Velocity and accelerations, stream lines, equation of continuity, irrotational and rotational flow, velocity potential and stream functions.

Continuity, momentum, energy equation, Navier Stokes equation, Euler's equation of motion, application to fluid flow problems, pipe flow, sluice gates, weirs.

3.2 Dimensional Analysis and Similitude: Buckingham's Pi-theorem, dimensionless parameters.

3.3 Laminar Flow :

Laminar flow between parallel, stationary and moving plates, flow through tube.

3.4 Boundary layer :

Laminar and turbulent boundary layer on a flat plate, laminar sub-layer, smooth and rough boundaries, drag and lift.

Turbulent flow through pipes : Characteristics of turbulent flow, velocity distribution and variation of pipe friction factor, hydraulic grade line and total energy line.

3.5 Open channel flow :

Uniform and non-uniform flows, momentum and energy correction factors, specific energy and specific force, critical depth, rapidly varied flow, hydraulic jump, gradually varied flow, classification of surface profiles, control section, step method of integration of varied flow equation.

3.6 Hydraulic Machines and Hydropower :

Hydraulic turbines, types classification, Choice of turbines performance parameters, controls, characteristics, specific speed.

Principles of hydropower development.

4. Geotechnical Engineering :

Soil Type and Structure—gradation and particle size distribution—consistency limits.

Water in soil—capillary and structural—effective stress and pore water pressure—permeability concept—filed and laboratory determination of permeability—Seepage pressure—quick sand conditions—Shear strength determination—Mohr Coulomb concept.

Compaction of soil—Laboratory and filed test.

Compressibility and consolidation concept— consolidation theory—consolidation settlement analysis.

Earth pressure theory and analysis for retaining walls, Application for sheet piles and Braced excavation.

Bearing capacity of soil—approaches for analysis- Filed tests—settlement analysis—stability of slope of earth walk.

Subsuface exploration of soils—methods

Foundation—Type and selection criteria for foundation of structures—Design criteria for foundation—Analysis of distribution of stress for footings and pile—pile group action—pile load test.

Ground improvement techniques.

PAPER—II

Government strives to have a workforce which reflects gender balance and women candidates are encouraged to apply.

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1. Construction Technology, Equipment, Planning and Management

1.1 Construction Technology

Engineering Materials :

Physical properties of construction materials with respect to their use in construction—Stones, Bricks and Tiles; Lime, Cement, different types of Mortars and Concrete.

Specific use of ferro cement, fibre reinforced C. C., High stength concrete.

Timber; Properties defects—common preservation treatments.

Use and selection of materials for specific use like Low Cost Housing, Mass Housing, High Rise Buildings.

1.2 Construction :

Masonry principles using Brick, stone, Blocks—construction detailing and strength characteristics.

Types of plastering, pointing, flooring, roofing and construction features.

Common repairs in buildings.

Principle of functional planning of building for residents and specific use—Building code provisions.

Basic principles of detailed and approximate estimating—specification writing and rate analysis-principles of valuation of real property.

Machinery for earthwork, concreting and their specific uses—Factors affecting selection of equipments—operating cost of equipments.

1.3 CONSTRUCTION PLANNING AND MANAGEMENT :

Construction activity—schedules—organization for construction industry—Quality assurance principles.

Use Basic principle of network—analysis in form of CPM and PERT—their use in construction monitoring, Cost optimization and resource allocation.

Basic principles of Economic analysis and methods.

Project profitability—Basic principles of Boot approach to financial planning-simple toll fixation criterions.

2. Surveying and Transportation Engineering

2.1 Surveying : Common methods and instruments for distance and angle measurement for CE work—their use in plane table, traverse survey, levelling work, triangulation, contouring and topographical map.

Basic principles of photogrammetry and remote sensing.

2.2 Railways Engineering : Permanent way—components, types and their function-Functions and Design constituents of turn and crossing— Necessity of geometric design of track—Design of station and yards.

2.3 Highway Engineering :

Principles of Highway alignments—classification and geometrical design elements and standards for

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Roads.

Pavement structure for flexible and rigid pavements—Design principles and methodology of pavements.

Typical construction methods and standards of materials for stabilized soil, WBM, Bituminous works and CC roads.

Surface and sub-surface drainge arrangements for roads—culvert structures.

Pavement distresses and strengthening by overlays.

Traffic surveys and their application in traffic planning—Typical design features for channelized, intersection rotary etc.—signal designs—standard Traffic signs and markings.

3. Hydrology, Water Resources and Engineering :

3.1 Hydrology :

Hydrological cycle, precipitation, evaporation, transpiration, infiltration, overland flow, hydrograph, flood frequency analyses, flood routing through a reservoir, channel flow routing—Muskingam method.

3.2 Ground Water flow :

Specific yield, storage coefficient, coefficient of permeability, confined and unconfined aquifers, aquifers, aquitards, radial flow into a well under confined and unconfined conditions.

3.3 Water Resources Engineering :

Ground and surface water resources, single and multipurpose projects, storage capacity of reservoirs, reservoir losses, reservoir sedimentation.

3.4 Irrigation Engineering :

(i) Water requirements of crops : consumptive use, duty and delta, irrigation methods and their efficiencies.

(ii) Canals : Distribution systems for cannal irrigation, canal capacity, canal losses, alignment of main and distributory canals, most efficient section, lined canals, their design, regime theory, critical shear stress, bed load.

(iii) Water logging : causes and control, salinity.

(iv) Canal structures : Design of head regulators, canal falls, aqueducts, metering flumes and canal outlets.

(v) Diversion head work : Principles and design of weirs on permeable and impermeable foundation, Khosla's theory, energy dissipation.

(vi) Storage works : Types of dams, design, principles of rigid gravity stability analysis.

(vii) Spillways : Spillway types, energy dissipation.

(viii) River training : Objectives of river training, methods of river training.

4. Environmental Engineering

4.1 Water Supply :

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Predicting demand for water, impurities of water and their significance, physical, chemical and bacteriological analysis, waterborne diseases, standards for potable water.

4.2 Intake of Water :

Water treatment: principles of coagulation, flocculation and sedimentation; slow-, rapid-, pressure, filters; chlorination, softening, removal of taste, odour and salinity.

4.3 Sewerage Systems :

Domestic and industrial wastes, store sewage—separate and combined systems, flow through sewers, design of sewers.

4.4 Sewage Characterisation :

BOD, COD, solids, dissolved oxygen, nitrogen and TOC. Standards of disposal in normal water course and on land.

4.5 Sewage Treatment :

Working principles, units, chambers, sedimentation tank, trickling filters, oxidation ponds, activated sludge process, septic tank, disposal of sludge, recycling of waste water.

4.6 Solid waste :

Collection and disposal in rural and urban contexts, management of long-term ill-effects.

5. Environmental pollution :

Sustainable development. Radioactive wastes and disposal. Environmental impact assessment for thermal power plants, mines, river valley projects. Air pollution. Pollution control acts.

COMMERCE AND ACCOUNTANCY

PAPER-I

Accounting and Finance

Accounting, Taxation & Auditing

1. Financing Accounting :

Accounting as a financial information system; Impact of behavioural sciences. Accounting Standards e.g., accounting for Depreciation, Inventories, Research and Development Costs, Long-term Construction Contracts, Revenue Recognition, Fixed Assets, Contingencies, Foreign Exchange Transactions, Investments and Government Grants, Cash Flow Statement, Earnings per Share.

Accounting for Share Capital Transactions including Bonus Shares, Right Shares.

Emplyees Stock Option and Buy-Back of Securities.

Preparation and Presentation of Company Final Accounts.

Amalgamations, Absorption and Reconstruction of Companies.

2. Cost Accounting :

Nature and functions of cost accounting. Installation of Cost Accounting System. Cost Concepts related to Income Measurement, Profit Planning, Cost Control and Decision Making.

Methods of Costing: Job Costing, Process Costing, Activity Based Costing.

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Volume-cost-Profit Relationship as a tool of Profit Planning.

Incremental Analysis/Differential Costing as a Tool of Pricing Decisions, Product Decisions, Make or Buy Decisions, Shut-Down Decisions etc.

Techniques of Cost Control and Cost Reduction : Budgeting as a Tool of Planning and Control. Standard Costing and Variance Analysis.

Responsibility Accounting and Divisional Performance Measurement.

3. Taxation :

Income Tax: Definitions. Basis of charge; Incomes which do not form part of total income. Simple problems of computation of income (of individuals only) under various heads, i.e., salaries, income from house property, profits and gains from business or profession, capital gains, income from other sources, Income of other persons included in assessee's total income.

Set-off and Carry forward of Loss.

Deductions from gross Total Income.

Salient Features/Provisions Related to VAT and Services Tax.

4. Auditing :

Company Audit: Audit related to Divisible Profits, Dividends, Special investigations, Tax audit.

Audit of banking, Insurance, Non-Profit Organization and Charitable societies/Trusts/Organizations.

Financial Management, Financial Institutions and Markets

1. Financial Management :

Finance Function : Nature, Scope and Objectives of Financial Management : Risk and Return relationship.

Tools of Financial Analysis: Ratio Analysis, Funds-Flow and Cash-Flow Statement.

Capital Budgeting Decisions: Process, Procedures and Appraisal Methods. Risk and Uncertainty Anlysis and Methods.

Cost of Capital : concept, Computation of Specific Costs and Weighted Average Cost of Capital. CAPM as aTool of Determining Cost of Equity Capital.

Financing Decisions: Theories of Capital Structure—Net Income (NI) Approach.

Net Operating Income (NOI) Approach, MM Approach and Traditional Approach. Designing of Capital structure: Types of Leverages (Operating, Financial and Combined), EBIT-EPS Analysis, and other Factors.

Dividend Decisions and Valuation of Firm : Walter's Model, MM Thesis, Gordan's Model Lintner's Model. Factors Affecting Dividend Policy.

Working Capital Management: Planning of Working Capital. Determinants of Working Capital. Components of Working Capital—Cash, Inventory and Receivables.

Corporate Restructuring with focus on Mergers and Acquisitions (Financial aspect only).

2. Financial Markets and Institutions :

Indian Financial System: An Overview

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Money Markets: Participants, Structure and Instruments. Commercial Banks. Reforms in Banking Sector. Monetary and Credit Policy of RBI. RBI as a Regulator.

Capital Market : Primary and Secondary Market. Financial Market Instruments and Innovative Debt Instruments; SEBI as a Regulator.

Financial Services : Mutual Funds, Venture Capital, Credit Rating Agencies, Insurance and IRDA.

PAPER-II

Organisation Theory and Behaviours, Human Resource Management and Industrial Relations

Organisation Theory and Behaviour

1. Organisation Theory :

Nature and Concept of Organisation; External Environment of Organisation—Technological, Social, Political, Ecomomical and Legal; Organizational Goals Primary and Secondary Goals, Single and Multiple Goals; Management by Objectives.

Evolution of Organisation theory : Classical Neo-classical and system approach.

Modern Concepts of Organisation Theory : Organisational Design, Organisational Structure and Organisational Culture.

Organisational Design—Basic Challenges; Differentiation and Intergration Process; Centralization and Decentralization Process; Standardization/Formalization and Mutual Adjustment. Coordinating Formal and Informal Organizations. Mechanistic and Organic Structures.

Designing Organizational structures—Authority and Control; Line and Staff Functions, Specialization and Coordination. Types of Organization Structure—Functional. Matrix Structure, Project Structure. Nature and Basis of Power, Sources of Power, Power Structure and Politics. Impact of Information Technology on Organizational Design and Structure.

Managing Organizational Culture.

2. Organisation Behaviour :

Meaning and Concept; Individual in organization: Personality, Theories, and Determinants; Pereception Meaning and Process.

Motivation : Concepts, Theories and Applications. Leadership—Theories and Styles. Quality of Work Life (QWL): Meaning and its impact on Performance, Ways of its Enhancement. Quality Circles (QC)—Meaning and their Importance. Management of Conflicts in Organizations. Transactional Analysis, Organizational Effectiveness, Management of Change.

Human Resources Management and Industrial Relations

1. Human Resources Management (HRM) :

Meaning Nature and Scope of HRM, Human Resource Planning, Job Analysis, Job Description, Job Specification, Recruitment Process, Selection Process, Orientational and Placement, Training and Development Process, Performance Appraisal and 360° Feed Back, Salary and Wage Administration, Job Evaluation, Employee Welfare, Promotions, Transfers and Separations.

2. Industrial Relations (IR) :

Meaning, Nature, Importance and Scope of IR, Formation of Trade Union, Trade Union Legislation, Trade Union Movement in India. Recognition of Trade Unions, Problems of Trade Unions in India.

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Impact of Liberalization on Trade Union Movement.

Nature of Industrial Disputes: Strikes and Lockouts, Causes of Disputes, Prevention and Settlement of Disputes.

Worker's Participation in Management: Philosophy, Rationale, Present Day Status and future Prospects.

Adjudication and Collective Bargaining.

Industrial Relations in Public Enterprises Absenteeism and Labour Turnover in Indian Industries and their Causes and Remedies.

ILO and its Functions.

ECONOMICS

PAPER—I

1. Advanced Micro Economics :

(a) Marshallian and Walrasian Approaches to Price determination.

(b) Alternative Distribution Theories : Ricardo, Kaldor, Kalecki.

(c) Markets Structure : Monopolistic Competition, Duopoly, Oligopoly.

(d) Modern Welfare Criteria : Pareto Hicks and Scitovsky, Arrow's Impossibility Theorem, A. K. Sen's Social Welfare Function.

2. Advance Macro Economics :

Approaches to Employment Income and Interest Rate determination : Classical, Keynes (IS-LM) curve, Neo-classical synthesis and New classical, Theories of Interest Rate determination and Interest Rate Structure.

3. Money-Banking and Finance :

(a) Demand for and Supply of Money : Money Multiplier Quantity Theory of Money (Fisher, Pigou and Friedman) and Keynes' Theory on Demand for Money, Goals and Instruments of Monetary Management in Closed and Open Economies. Relation between the Central Bank and the Treasury. Proposal for ceiling on growth rate of money.

(b) Public Finance and its Role in market economy : in stabilization of supply, allocation of resources and in distribution and development. Sources of Government revenue, forms of Taxes and Subsidies, their incidence and effects. Limits to taxation, loans, crowding-out effects and limits to borrowings. Public expenditure and its effects.

4. International Economics :

(a) Old and New theories of International Trade.

(i) Comparative advantage,

(ii) Terms of Trade and offer curve.

(iii) Product cycle and Strategic trade theories.

(iv) Trade as an engine of growth and theories of underdevelopment in an open economy.

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(b) Forms of protection : Tariff and quota.

(c) Balance of Payments Adjustments : Alternative Approaches.

(i) Price versus income, income adjustments under fixed exchange rates.

(ii) Theories of Policy mix.

(iii) Exchange rate adjustments under capital mobility.

(iv) Floating Rates and their implications for developing Countries: Currency Boards.

(v) Trade Policy and Developing Countries.

(vi) BOP, adjustments and Policy Coordination in open economy macro-model.

(vii) Speculative attacks.

(viii) Trade Blocks and Monetary Unions.

(ix) WTO : Trims, TRIPS, Domestic Measures, Different Rounds of WTO talks.

5. Growth and Development:

(a) (i) Theories of growth : Harrod's model;

(ii) Lewis model of development with surplus labour.

(iii) Balanced Unbalanced Growth.

(iv) human capitals and Economic Growth.

(v) Research and Development and Economic Growth.

(b) Process of Economic Development of less developed countries: Myrdal and Kuznets on economic development and structural change: Role of Agriculture in Economic Development of less developed countries.

(c) Economic Development and International Trade and Investment, Role of Multinationals.

(d) Planning and economic Development: changing role of Markets and Planning, Private-Public Partnership.

(e) Welfare indicators and measures of growth—Human development indices. The basic needs approach.

(f) Development and Environmental Sustainability—Renewable and Non Renewable Resources, Environmental Degradation, Intergenerational equity development.

PAPER-II

Indian Economy in Pre-Independence Era :

Land System and its changes, Commercialization of agriculture Drain theory, Laissez faire theory and critique. Manufacture and Transport: Jute, Cotton, Railways, Money and Credit.

Indian Economy after Independence :

A. The Pre-Liberalization Era :

(i) Contribution of Vakil, Gadgil and V.K.R.V. Rao.

(ii) Agriculture: Land Reforms and land tenure system, Green Revolution and capital formation in agriculture.

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(iii) Industry Trends in composition and growth, Role of public and private sector, Small scale and cottage industries.

(iv) National and Per capita income : patterns, trends, aggregate and Sectoral composition and changes therein.

(v) Broad factors determining National Income and distribution, Measures of poverty, Trends in poverty and inequality.

B. The Post Liberalization Era :

(i) New Economic Reform and Agriculture: Agriculture and WTO, Food processing, subsidies, Agricultural prices and public distribution system, Impact of public expenditure on agricultural growth.

(ii) New Economic Policy and Industry: Strategy of industrialization, Privatization, Disinvestments, Role of foreign direct investment and multinationals.

(iii) New Economic Policy and Trade: Intellectual property rights : Implications of TRIPS, TRIMS, GATS and new EXIM policy.

(iv) New Exchange Rate Regime: Partial and full convertibility, Capital account convertibility.

(v) New Economic Policy and Public Finance : Fiscal Responsibility Act, Twelfth Finance Commission and Fiscal Federalism and Fiscal Consolidation.

(vi) New Economic Policy and Monetary system. Role of RBI under the new regime.

(vii) Planning: From central Planning to indicative planning, Relation between planning and markets for growth and decentralized planning: 73rd and 74th Constitutional amendments.

(viii) New Economic Policy and Employment: Employment and poverty, Rural wages, Employment Generation, Poverty alleviation schemes, New Rural, Employment Guarantee Scheme.

ELECTRICAL ENGINEERING

PAPER-I

1. Circuits—Theory :

Circuit components; network graphs; KCL, KVL; Circuit analysis methods : nodal analysis, mesh analysis; basic network theorems and applications; transient analysis : RL, RC and RLC circuits; sinusoidal steady state analysis; resonant circuits; coupled circuits; balanced 3-phase circuits. Two-port networks.

2. Signals and Systems :

Representation of continuous-time and discrete-time signals and systems; LTI systems; convolution; impulse response; time-domain analysis of LTI systems based on convolution and differential/difference equations. Fourier transform, Laplace transform, Z-transform, Transfer function. Sampling and recovery of signals DFT, FFT Processing of analog signals through discrete-time systems.

3. E.M. Theory :

Maxwell's equations, wave propagation in bounded media. Boundary conditions, reflection and refraction of plane waves. Transmission lines : travelling and standing waves, impedance matching, Smith chart.

4. Analog Electronics :

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Characteristics and equivalent circuits (large and small-signal) of Diode, BJT, JFET and MOSFET. Diode circuits : Clipping, clamping, rectifier. Biasing and bias stability. FET amplifiers. Current mirror;

Amplifiers : single and multi-stage, differential, operational feedback and power. Analysis of amplifiers; frequency-response of amplifiers. OPAMP circuits. Filters; sinusoidal oscillators : criterion for oscillation; single-transistor and OPAMP configurations. Function generators and wave-shaping circuits. Linear and switching power supplies.

5. Digital Electronics :

Boolean algebra; minimisation of Boolean functions; logic gates; digital IC families (DTL, TTL, ECL, MOS, CMOS). Combinational circuits : arithmetic circuits, code converters, multiplexers and decoders. Sequential circuits: latches and flip-flops, counters and shift-registers. Comparators, timers, multivibrators. Sample and hold circuits, ADCs and DACs. Semiconductor memories. Logic implementation using programmable devices (ROM, PLA, FPGA).

6. Energy Conversion :

Principles of electromechanical energy conversion : Torque and emf in rotating machines. DC machines : characteristics and performance analysis; starting and speed control of motors. Transformers : principles of operation and analysis; regulation, efficiency; 3-phase transformers. 3-phase induction machines and synchronous machines : characteristics and performance analysis; speed control.

7. Power Electronics and Electric Drives :

Semi-conductor power devices : diode, transistor, thyristor, triac, GTO and MOSFET-static characteristics and principles of operation; triggering circuits; phase control rectifiers; bridge converters : fully-controlled and half-controlled; principles of thyristor choppers and inverters; DC-DC converters; Switch mode inverter; basic concepts of speed control of dc and ac motor drives applications of variable-speed drives.

8. Analog Communication :

Random variables : continuous, discrete; probability, probability functions. Statistical averages; probability models; Random signals and noise : white noise, noise equivalent bandwidth; signal transmission with noise; signal to noise ratio. Linear CW modulation : Amplitude modulation : DSB, DSB-SC and SSB. Modulators and Demodulators; Phase and Frequency modulation : PM & FM signals; narrows band FM; generation & detection of FM and PM, Deemphasis, Preemphasis. CW modulation system : Superhetrodyne receivers, AM receivers, communication receivers, FM receivers, phase locked loop, SSB receiver Signal to noise ratio calculation or AM and FM receivers.

PAPER II

1. Control Systems :

Elements of control systems; block-diagram representations; open-loop & closed-loop systems; principles and applications of feed-back. Control system components. LTI systems : time-domain and transform-domain analysis. Stability : Routh Hurwitz criterion, root-loci, Bode-plots and polor plots, Nyquist's criterion; Design of lead-lad compensators. Proportional, PI, PID controllers. State-variable representation and analysis of control systems.

2. Microprocessors and Microcomputers :

PC organisation; CPU, instruction set, register settiming diagram, programming, interrupts, memory interfacing, I/O interfacing, programmable peripheral devices.

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3. Measurement and Instrumentation :

Error analysis; measurement of current voltage, power, energy, power-factor, resistance, inductance, capacitance and frequency; bridge measurements. Signal conditioning circuit; Electronic measuring instruments : multimeter, CRO, digital voltmeter, frequency counter, Q-meter, spectrum-analyser, distoration-meter. Transducers : thermocouple, thermistor, LVDT, strain-guage, piezo-electric crystal.

4. Power Systems: Analysis and Control :

Steady-state performance of overhead transmission lines and cables; principles of active and reactive power transfer and distribution; per-unit quantities; bus admittance and impedance matrices; load flow; voltage control and power factor correction; economic operation; symmetrical components, analysis of symmetrical and unsymmetrical faults. Concepts of system stability : swing curves and equal area criterion. Static VAR system. Basic concepts of HVDC transmission.

5. Power System Protection :

Principles of overcurrent, differential and distance protection. Concept of solid state relays. Circuit brakers. Computer aided protection : introduction; line, bus, generator, transformer protection; numeric relays and application of DSP to protection.

6. Digital Communication :

Pulse code modulation (PCM), defferential pulse code modulation (DPCM), delta modulation (DM), Digital modulation and demodulation schemes : amplitude, phase and frequency keying schemes (ASK, PSK, FSK). Error control coding : error detection and correction, linear block codes, convolation codes. Information measure and source coding. Data networks, 7-layer architecture.

GEOGRAPHY

PAPER I

PRINCIPLES OF GEOGRAPHY

Physical Geography :

1. GEOMORPHOLOGY : Factors controlling landform development; endogenetic and exogenetic forces; Origin and evolution of the earth's crusts; Fundamentals of geomagnetism; Physical conditions of the earth's interior; Geosynclines; Continental drift; Isostasy; Plate tectonics; Recent views on mountain building; Volcanicity; Earthquakes and Tsunamis; Concepts of geomorphic cycles and Land scape development; Denudation chronology; Channel morphology; Erosion surfaces; Slope development; Applied Geomorphology; Geomorphology, economic geology and environment.

2. Climatology : Temperature and pressure belts of the world; Heat budget of the earth; Atmospheric circulation; Atmospheric stability and instability. Planetary and local winds; Monsoons and jet streams; Air masses and fronto; Temperate and tropical cyclones; Types and distribution of precipitation; Weather and Climate; Koppen's Thornthwaite's and Trewar Tha's classification of world climate; Hydrological cycle; Global climatic change, and role and response of man in climatic changes Applied climatology and Urban climate.

3. Oceanography : Bottom topography of the Atlantic, Indian and Pacific Oceans; Temperature and salinity of the oceans; Heat and salt budgets, Ocean deposits; Waves, currents and tides; Marine resources; biotic, mineral and energy resources; Coral reefs coral bleaching; Sea-level changes; Law of the sea and marine pollution.

4. Biogeography : Genesis of soils; Classification and distribution of soils; Soil profile; Soil erosion,

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Degrada-tion and conservation; Factors influencing world distribution of plants and animals; Problems of deforestation and conservation measures; Social forestry, agro-forestry; Wild life; Major gene pool centres.

5. Environmental Geography : Principle ecology; Human ecological adaptations; Influence of man on ecology and environment; Global and regional ecological changes and imbalances; Ecosystem their management and conservation; Environmental degradation, management and conservation; Biodiversity and sustainable development; Environmental policy; Environmental hazards and remedial measures; Environmental education and legislation.

Human Geography :

1. Perspectives in Human Geography : Areal differentiation; Regional synthesis; Dichotomy and dualism; Environmentalism; Quantitative revolution and locational analysis; Radical, behavioural, human and welfare approaches; Languages, religions and secularisation; Cultural regions of the world; Human development indix.

2. Economic Geography : World economic development: measurement and problems; World resources and their distribution; Energy crisis; the limits to growth; World agriculture: typology of agricultural regions; Agricultural inputs and productivity; Food and nutritions problems; Food security; famine: causes, effects and remedies; World industries: location patterns and problems; Patterns of world trade.

3. Population and Settlement Geography : Growth and distribution of world population; Demographic attributes; Causes and consequences of migration; Concepts of over-under-and optimum population; Population theories, world population problems and policies, Social well-being and quality of life; Population as social capital.

Types and patterns of rural settlements; Environmental issues in rural settlements; Hierarchy of urban settlements; Urban morphology; Concept of primate city and rank-size rule; Functional classification of towns; Sphere of urban influence; Rural-urban fringe; Satellite towns; Problems and remedies of urbanization; Sustainable development of cities.

4. regional Planning : Concept of a region; Types of regions and methods of regionalisation; Growth centres and growth poles; Regional imbalances; Regional development strategies; Environmental issues in regional planning; Planning for sustainable development.

5. Models, Theories and Laws in Human Geography : System analysis in Human geography; Malthusian, Marxian and demographic transition models; Central Place theories of Christaller and Losch; Perroux and Boudeville; Von Thunen's model of agricultural location; Weber's model of industrial location; Ostov's model of stages of growth. Heart-land and Rimland theories; Laws of international boundaries and frontiers.

PAPER II

GEOGRAPHY OF INDIA

1. Physical Setting : Space relationship of India with neighbouring countries; Structure and relief; Drainage system and watersheds; Physiographic regions; Mechanism of Indian monsoons and rainfall patterns; Tropical cyclones and western disturbances; Floods and droughts; Climatic regions; Natural vegetation, Soil types and their distributions.

2. Resources : Land, surface and ground water, energy, minerals, biotic and marine resources, Forest and wild life resources and their conservation; Energy crisis.

3. Agriculture : Infrastructure: irrigation, seeds, fertilizers, power; Institutional factors; land holdings, land tenure and land reforms; Cropping pattern, agricultural productivity, agricultural intensity, crop combination, land capability; Agro and social-forestry; Green revolution and its socio-economic and

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ecological implications; Significance of dry farming; Livestock resources and white revolution; Aqua-culture; Sericulture, Agriculture and poultry; Agricultural regionalisation; Agro-climatic zones; Agro-ecological regions.

4. Industry : Evolution of industries; Locational factors of cotton, jute, textile, iron and steel, aluminium, fertiliser, paper, chemical and pharmaceutical, automobile, cottage and ago-based industries; Industrial houses and complexes including public sector underkings; Industrial regionalisation; New industrial policy; Multinationals and liberalisation; Special Economic Zones; Tourism including ecotourism.

5. Transport, Communication and Trade : Road, railway, waterway, airway and pipeline net works and their complementary roles in regional development; Growing importance of ports on national and foreign trade; Trade balance; Trade Policy;Export processing zones; Developments in communication and information technology and their impacts on economy and society; Indian space programme.

6. Cultural Setting : Historical Perspective of Indian Society; Racial linguistic and ethnic diversities; religious minorities; Major tribes, tribal areas and their problems; Cultural regions; Growth, distribution and density of population; Demographic attributes: sex-ratio, age structure, literacy rate, work-force, dependency ratio, longevity; migration (inter-regional, interaregional and international) and associated problems; Population problems and policies; Health indicators.

7. Settlements : Types, patterns and morphology of rural settlements; Urban developments; Morphology of Indian cities; Functional classification of Indian cities; Conurbations and metropolitan regions; Urban sprawl; Slums and asssociated problems; Town planning; Problems of urbanisation and remedies.

8. Regional Development and Planning: Experience of regional planning in India; Five Year Plans; Integrated rural development programmes; Panchayati Raj and decentralised planning; Command area development; Watershed management; Planning for backward area, desert, drought-prone, hill tribal area development; Multi-level planning; Regional planning and development of island territories.

9. Political Aspects : Geographical basis of Indian federalism; State reorganisation; Emergence of new states; Regional consciousness and inter-state issues; International boundary of India and related issues; Cross-border terrorism; India's role in world affairs; Geopolitics of South Asia and Indian Ocean realm.

10. Contemporary Issues : Ecological issues: Environmental hazards: landslides, earthquakes, Tsunamis, floods and droughts, epidemics; Issues related to environmental pollution; Changes in patterns of land use; Principles of environmental impact assessment and environmental management; Population explosion and food security; Environmental degradation; Deforestation, desertification and soil erosion; Problems of agrarian and industrial unrest; Regional disparities in economic development; Concept of sustainable growth and development; Environmental awareness; Linkage of rivers; Globalisation and Indian economy.

NOTE : Candidates will be required to answer one compulsory map question pertinent to subjects covered by this paper.

GEOLOGY

PAPER I

1. General Geology :

The Solar System, meteorites, origin and interior of the earth and age of earth; Volcanoes—causes and products, Volcanic belts. Earthquakes—causes, effects, seismic of zone of India; Island arcs, trenches

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and mid-ocean ridges; Continental drift; Seafloor spreading, plate tectonics. Isostasy.

2. Geomorphology and Remote Sensing :

Basic concepts of geomorphology. Weathering and soil formations; Landforms, slopes and drainage. Geomorphic cycles and their interpretation. Morphology and its relation to structures and lithology; Coastal geomorphology; Applications of geomorphology in mineral prospecting, civil engineering; hydrology and environmental studies; Geomorphology of Indian sub-continent.

Aerial photographs and their interpretation—merits and limitations; The Electromagnetic spectrum. Orbiting Satellites and Sensor Systems. Indian Remote Sensing Satellites. Satellite data products; Applications of remote sensing in geology; The Geographic Information System (GIS) and Global Positioning System (GPS)—its applications.

3. Structural Geology :

Principles of geologic mapping and map reading, projection diagrams, Stress and strain ellipsoid and stress-strain relationships of elastic, plastic and viscous materials; Strain markers in deformed rocks. Behaviour of minerals and rocks under deformation conditions. Folds and faults classification and mechanics; Structural analysis of folds, foliations, lineations, joints and faults, unconformities; Time-relationship between crystallization and deformation.

4. Paleontology :

Species—definition and nomenclature; Megafossils and Microfossils. Modes of preservation of fossils; Different kinds of microfossils; Application of microfossils in correlation, petroleum exploration, paleoclimatic and paleoceanographic studies; Evolutionary trend in Hominidae, Equidae and Proboscidae. Siwalik fauna.

Gondwana flora and fauna and its importance; Index fossils and their significance.

5. Indian Stratigraphy :

Classification of stratigraphic sequences: lithostrati-graphic, biostratigraphic, chrono-stratigraphic and magnetostratigraphic and their interrelationships; Distribution and classification of Precambrian rocks of India; Study of stratigraphic distribution and lithology of Phanerozoic rocks of India with reference to fauna, flora and economic importance. Major boundary problems—Cambrian/ Precambrian, Permian/Triassic, Cretaceous/Tertiary and Pliocene/Pleistocene; Study of climatic conditions, paleogeography and igneous activity in the Indian sub-continent in the geological past. Tectonic framework of India. Evolution of the Himalayas.

6. Hydrogeology and Engineering Geology :

Hydrologic cycle and genetic classification of water; Movement of subsurface water; Springs; Porosity, permeability, hydraulic conductivity, transmissivity and storage coefficient, classification of aquifers; Water-bearing characteristics of rocks; Groundwater chemistry. Salt water intrusion. Types of wells. Drainage basin morphometry; Exploration for groundwater; Groundwater recharge; Problems and management of groundwater; Rainwater harvesting; Engineering properties of rocks; Geological investigations for dams, tunnels highways, railway and bridges; Rock as construction material; Landslides causes, prevention and rehabilitation; Earthquake-resistant structures.

PAPER II

1. Mineralogy :

Classification of crystals into systems and classes of symmetry; International system of crystallographic notation; Use of projection diagrams to represent crystal symmetry; Elements of X-ray

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crystallography.

Physical and chemical characters of rock forming silicate mineral groups; Structural classification of silicates; Common minerals of igneous and metamorphic rocks; Minerals of the carbonate, phosphate, sulphide and halide groups; Clay minerals.

Optical properties of common rock forming minerals; Pleochroism, extinction angle, double refraction, birefringence, twinning and dispersion in minerals.

2. Igneous and Metamorphic Petrology :

Generation and crystallisation of magmas. Crystallisation of albite—anorthite, diopside—anorthite and diopside—wollastonite—silica systems. Bowen's Reaction Principle; Magmatic differentiation and assimilation. Petrogenetic significance of the textures and structures of igneous rocks. Petrography and petrogenesis of granite, syenite, diorite, basic and ultrabasic groups, charnockite, anorthosite and alkaline rocks. Carbonatites. Deccan volcanic province.

Types and agents of metamorphism. Metamorphic grades and zones; Phase rule. Facies of regional and contact metamorphism; ACF and AKF diagrams; Textures and structures of metamorphic rocks. Metamorphism of arenaceous, argillaceous and basic rocks; Minerals assemblages. Retrograde metamorphism; Metasomatism and granitisation, migmatites. Granulite terrains of India.

3. Sedimenary Petrology :

Sedimentas and Sedimentary rocks: Processes of formation; digenesis and lithification; Clastic and non-clastic rocks-their classification, petrography and depositional environment; Sedimentary facies and provenance. Sedimentary structures and their significance. Heavy minerals and their significance. Sedimentary basins of India.

4. Economic Geology :

Ore, ore mineral and gangue, tenor of ore. Classification of ore deposits; Processes of formation of mineral deposits; Controls of ore localisation; Ore texures and structures; Metallogenic epochs and provinces; Geology of the important Indian deposits of aluminium, chromium, copper, gold, iron, lead, zinc, manganese, titanium, uranium and thorium and industrial minerals; Deposits of coal and petroleum in India, National Mineral Policy; Conservation and utilization of mineral resources. Marine mineral resources and Law of Sea.

5. Mining Geology :

Methods of prospecting—geological, geophysical, geochemical and geobotanical; Techniques of sampling. Estimation of reserves of ore; Methods of exploration and mining-metallic ores, industrial minerals, marine mineral resources and building stones. Mineral beneficiation and ore dressing.

6. Geochemistry and Environmental Geology :

Cosmic abundance of elements. Composition of the planets and meteorites. Structure and composition of earth and distribution of elements. Trace elements. Elements of crystal chemistry-types of chemical bonds, coordination number. Isomorphism and polymorphism. Elementary thermodynamics.

Natural hazards—floods, mass wasting, costal hazards, earthquakes and volcanic activity and mitigation; Environmental impact of urbanization, mining, industrial and radioactive waste disposal, use of fertilizers, dumping of mine waste and fly-ash. Pollution of ground and surface water, marine pollution. Environment protection—legislative measures in India; Sea level changes: causes and impact.

HISTORY

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PAPER I

1. Sources

Archaeological sources :

Exploration, excavation, epigraphy, numismatics, monuments.

Literary sources:

Indigenous: Primary and secondary; poetry, scientific literature, literature, literature in regional languages, religious literature.

Foreign account: Greek, Chinese and Arab writers.

2. Pre-history and Proto-history :

Geographical factors; hunting and gathering (paleolithic and mesolithic); Beginning of agriculture (neolithic and chalcolithic).

3. Indus Valley Civilization :

Origin, date, extent, characteristics-decline, survival and significance, art and architecture.

4. Megalithic Cultures :

Distribution of pastoral and farming cultures outside the Indus, Development of community life, Settlements, Development of agriculture, Crafts, Pottery, and Iron industry.

5. Aryans and Vedic Period :

Expansions of Aryans in India :

Vedic Period: Religious and philosophic literature; Transformation from Rig Vedic period to the later Vedic period; Political, social and economical life; Significance of the Vedic Age; Evolution of Monarchy and Varna system.

6. Period of Mahajanapadas :

Formation of States (Mahajanapada): Republics and monarchies; Rise of urban centres; Trade routes; Economic growth; Introduction of coinage; Spread of Jainism and Buddism; Rise of Magadha and Nandas.

Iranian and Mecedonian invasions and their impact.

7. Mauryan Empire :

Foundation of the Mauryan Empire, Chandragupta, Kautilya and Arthashastra; Ashoka; Concept of Dharma; Edicts; Polity, Administration, Economy; Art, architecture and sculpture; External contacts; Religion; Spread of religion; Literature.

Disintegration of the empire; sungas and Kanvas.

8. Post-Mauryan Period (Indo-Greeks, Sakas, Kushanas, Western Kshatrapas) :

Contact with outside world; growth of urban centres, economy, coinage, development of religions, Mahayana, social conditions, art, architecture, culture, literature and science.

9. Early State and Society in Eastern India, Deccan and South India:

Kharavela, The Satavahanas, Tamil States of the Sangam Age; Administration, Economy, land grants, coinage, trade guilds and urban centres; Buddhist centres; Sangam literature and culture; Art and architecture.

10. Guptas, Vakatakas and Vardhanas:

Polity and administration, Economic conditions, Coinage of the Guptas, Land grants, Decline of urban

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centres, Indian feudalism, Caste system, Position of women, Education and educational institutions; Nalanda, Vikramshila and Vallabhi, Literature, scientific literature, art and architecture.

11. Regional States during Gupta Era:

The Kadambas, Pallavas, Chalukyas of Badami; Polity and Administration, Trade guilds, Literature; growth of Vaishnava and Saiva religions. Tamil Bhakit movement, Shankaracharya; Vedanta; Institutions of temple and temple architecture; Palas, Senas, Rashtrakutas, Paramaras, Polity and administration; Cultural aspects. Arab conquest of Sind; Alberuni, The Chaluky as of Kalyana, Cholas, Hoysalas, Pandyas; Polity and Administration; Local Government; Growth of art and architecture, religious sects, Institution of temple and Mathas, Agraharas, education and literature, economy and society.

12. Themes in Early Indian Cultural History:

Languages and texts, major stages in the evolution of art and architecture, major philosophical thinkers and schools, ideas in Science and Mathematics.

13. Early Medieval India, 750-1200:

— Polity: Major political developments in Northern India and the peninsula, origin and the rise of Rajputs.

— The Cholas: administration, village economy and society “Indian Feudalism”.

— Agrarian economy and urban settlements.

— Trade and commerce.

— Society: the status of the Brahman and the new social order.

— Condition of women.

— Indian science and technology.

14. Cultural Traditions in India, 750-1200:

— Philosophy: Skankaracharya and Vedanta, Ramanuja and Vishishtadvaita, Madhva and Brahma-Mimansa.

— Religion: Forms and features of religion, Tamil devotional cult, growth of Bhakti, Islam and its arrival in India, Sufism.

— Literature: Literature in Sanskrit, growth of Tamil literature, literature in the newly developing languages, Kalhan's Rajtarangini, Alberuni's India.

— Art and Architecture: Temple architecture, sculpture, painting.

15. The Thirteenth Century:

— Establishment of the Delhi Sultanate: The Ghurian invasions - factors behind Ghurian success.

— Economic, Social and cultural consequences.

— Foundation of Delhi Sultanate and early Turkish Sultans.

— Consolidation: The rule of Iltutmish and Balban.

16. The Fourteenth Century:

— “The Khalji Revolution”.

— Alauddin Khalji: Conquests and territorial expansion, agrarian and economic measure.

— Muhammad Tughluq: Major projects, agrarian measures, bureaucracy of Muhammad Tughluq.

— Firuz Tugluq: Agrarian measures, achievements in civil engineering and public works, decline of the

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Sultanate, foreign contacts and Ibn Battuta's account.

17. Society, Culture and Economy in the Thirteenth and Fourteenth Centuries:

— Society: composition of rural society, ruling classes, town dwellers, women, religious classes, caste and slavery under the Sultanate, Bhakti movement, Sufi movement.

— Culture: Persian literature, literature in the regional languages of North India, literaute in the languages of South India, Sultanate architecture and new structural forms, painting, evolution of a composite culture.

— Economy: Agricultural Production, rise of urban economy and non-agricultural production, trade and commerce.

18. The Fifteenth and Early Sixteenth Century-Political Developments and Economy:

— Rise of Provincial Dynasties : Bengal, Kashmir (Zainul Abedin), Gujarat.

— Malwa, Bahmanids.

— The Vijayanagara Empire.

— Lodis.

— Mughal Empire, first phase : Babur, Humayun.

— The Sur Empire : Sher Shah's administration.

— Portuguese colonial enterprise, Bhakti and Sufi Movements.

19. The Fifteenth and Early Sixteenth Century- Society and culture:

— Regional cultures specificities.

— Literary traditions.

— Provincial architectural.

— Society, culture, literature and the arts in Vijayanagara Empire.

20. Akbar:

— Conquests and consolidation of empire.

— Establishment of *jagir* and *mansab* systems.

— Rajput policy.

— Evolution of religious and social outlook. Theory of *Sulh-i-kul* and religious policy.

— Court patronage of art and technology.

21. Mughal Empire in the Seventeenth Century:

— Major administrative policies of Jahangir, Shahjahan and Aurangzeb.

— The Empire and the Zamindars.

— Religious policies of Jahangir, Shahjahan and Aurangzeb.

— Nature of the Mughal State.

— Late Seventeenth Century crisis and the revolts.

— The Ahom kingdom.

— Shivaji and the early Maratha Kingdom.

22. Economy and society, in the 16th and 17th Centuries:

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— Population Agricultural and craft production.

— Towns, commerce with Europe through Dutch, English and French companies : a trade revolution.

— Indian mercantile classes. Banking, insurance and credit systems.

— Conditions of peasants, Condition of Women.

— Evolution of the Sikh community and the Khalsa Panth.

23. Culture during Mughal Empire:

— Persian histories and other literature.

— Hindi and religious literatures.

— Mughal architecture.

— Mughal painting.

— Provincial architecture and painting.

— Classical music.

— Science and technology.

24. The Eighteenth Century:

— Factors for the decline of the Mughal Empire.

— The regional principalities: Nizam's Deccan, Bengal, Awadh.

— Maratha ascendancy under the Peshwas.

— The Maratha fiscal and financial system.

— Emergence of Afghan power Battle of Panipat, 1761.

— State of, political, cultural and economic, on eve of the British conquest.

PAPER-II

1. European Penetration into India:

The Early European Settlements; The Portuguese and the Dutch; The English and the French East India Companies; Their struggle for supremacy; Carnatic Wars; Bengal-The conflict between the English and the Nawabs of Bengal; Siraj and the English; The Battle of Plassey; Significance of Plassey.

2. British Expansion in India:

Bengal-Mir Jafar and Mir Kasim; The Battle of Buxar; Mysore; The Marathas; The three Anglo-Maratha Wars; The Punjab.

3. Early Structure of the British Raj:

The Early administrative structure; From diarchy to direct contol; The Regulating Act (1773); The Pitt's India Act (1784); The Charter Act (1833); The Voice of free trade and the changing character of British colonial rule; The English utilitarian and India.

4. Economic Impact of British Colonial Rule:

(a) Land revenue settlements in British India; The Permanent Settlement; Ryotwari Settlement; Mahalwari Settlement; Economic impact of the revenue arrangements; Commercialization of agriculture; Rise of landless agrarian labourers; Impoverishment of the rural society.

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(b) Dislocation of traditional trade and commerce; De-industrialisation; Decline of traditional crafts; Drain of wealth; Economic transformation of India; Railroad and communication network including telegraph and postal services; Famine and poverty in the rural interior; European business enterprise and its limitations.

5. Social and Cultural Developments:

The state of indigenous education, its dislocation; Orientalist-Anglicist controversy, The introduction of western education in India; The rise of press, literature and public opinion; The rise of modern vernacular literature; Progress of Science; Christian missionary activities in India.

6. Social and Religious Reform Movements in Bengal and Other Areas:

Ram Mohan Roy, The Brahmo Movement; Devendranath Tagore; Iswarchandra Vidyasagar; The Young Bengal Movement; Dayanada Saraswati; The social reform movements in India including Sati, widow remarriage, child marriage etc.; The contribution of Indian renaissance to the growth of modern India; Islamic revivalism-the Feraizi and Wahabi Movements.

7. Indian Response to British Rule:

Peasant movement and tribal uprisings in the 18th and 19th centuries including the Rangpur Dhing (1783), the Kol Rebellion (1832), the Mopla Rebellion in Malabar (1841-1920), the Santal Hul (1855), Indigo Rebellion (1859-60), Deccan Uprising (1875) and the Munda Ulgulan (1899-1900); The Great Revolt of 1857 —Origin, character, casuses of failure, the consequences; The shift in the character of peasant uprisings in the post-1857 period; the peasant movements of the 1920s and 1930s.

8. Factors leading to the birth of Indian Nationalism; Politics of Association; The Foundation of the Indian National Congress; The Safety-valve thesis relating to the birth of the Congress; Programme and objectives of Early Congress; the social composition of early Congress leadership; the Moderates and Extremists; The Partition of Bengal (1905); The Swadeshi Movement in Bengal; the economic and political aspects of Swadeshi Movement; The beginning of revolutionary extremism in India.

9. Rise of Gandhi; Character of Gandhian nationalism; Gandhi's popular appeal; Rowlatt Satyagraha; the Khilafat Movement; the Non-cooperation Movement; National politics from the end of the Non-cooperation movement to the beginning of the Civil Disobedience Movement; the two phases of the Civil Disobedience Movement; Simon Commission; The Nehru Report; the Round Table Conferences; Nationalism and the Peasant Movements; Nationalism and Working class movements; Women and Indian youth and students in Indian politics (1885-1947); the election of 1937 and the formation of ministries; Cripps Mission; the Quit India Movement; the Wavell Plan; The Cabinet Mission.

10. Constitutional Developments in the Colonial India between 1858 and 1935.

11. Other strands in the National Movement.

The Revolutionaries: Bengal, the Punjab, Maharashtra, U.P. the Madras Presidency, Outside India.

The Left; The Left within the Congress: Jawaharlal Nehru, Subhas Chandra Bose, the Congress Socialist Party; the Communist Party of India, other left parties.

12. Politics of Separatism; the Muslim League; the Hindu Mahasabha; Communalism and the politics of partition; Transfer of power; Independence.

13. Consolidation as a Nation; Nehru's Foreign Policy; India and her neighbours (1947-1964); The linguistic reorganisation of States (1935-1947); Regionalism and regional inequality; Integration of Princely States; Princes in electoral politics; the Question of National Language.

14. Caste and Ethnicity after 1947; Backward Castes and Tribes in post-colonial electoral politics; Dalit movements.

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15. Economic development and political change; Land reforms; the politics of planning and rural reconstruction; Ecology and environmental policy in post-colonial India; Progress of Science.

16. Enlightenment and Modern ideas:

(i) Major Ideas of Enlightenment : Kant, Rousseau.

(ii) Spread of Enlightenment in the colonies.

(iii) Rise of socialist ideas (up to Marx); spread of Marxian Socialism.

17. Origins of Modern Politics :

(i) European States System.

(ii) American Revolution and the Constitution.

(iii) French Revolution and Aftermath, 1789-1815.

(iv) American Civil War with reference to Abraham Lincoln and the abolition of slavery.

(v) British Democratic politics, 1815-1850 : Parliamentary Reformers, Free Traders, Chartists.

18. Industrialization :

(i) English Industrial Revolution : Causes and Impact on Society.

(ii) Industrialization in other countries : USA, Germany, Russia, Japan.

(iii) Industrialization and Globalization.

19. Nation-State System :

(i) Rise of Nationalism in 19th century.

(ii) Nationalism : State-building in Germany and Italy.

(iii) Disintegration of Empires in the face of the emergence of nationalities across the World.

20. Imperialism and Colonialism :

(i) South and South-East Asia.

(ii) Latin America and South Africa.

(iii) Australia.

(iv) Imperialism and free trade: Rise of neo-imperialism.

21. Revolution and Counter-Revolution :

(i) 19th Century European revolutions.

(ii) The Russian Revolution of 1917-1921.

(iii) Fascist Counter-Revolution, Italy and Germany.

(iv) The Chinese Revolution of 1949.

22. World Wars :

(i) 1st and 2nd World Wars as Total Wars : Societal implications.

(ii) World War I : Causes and Consequences.

(iii) World War II : Causes and Consequences.

23. The World after World War II:

(i) Emergence of Two power blocs.

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(ii) Emergence of Third World and non-alignment.

(iii) UNO and the global disputes.

24. Liberation from Colonial Rule :

(i) Latin America-Bolivar.

(ii) Arab World-Egypt.

(iii) Africa-Apartheid to Democracy.

(iv) South-East Asia-Vietnam.

25. Decolonization and Underdevelopment :

(i) Factors constraining Development ; Latin America, Africa.

26. Unification of Europe :

(i) Post War Foundations ; NATO and European Community.

(ii) Consolidation and Expansion of European Community

(iii) European Union.

27. Disintegration of Soviet Union and the Rise of the Unipolar World :

(i) Factors leading to the collapse of Soviet Communism and Soviet Union, 1985-1991.

(ii) Political Changes in East Europe 1989-2001.

(iii) End of the Cold War and US Ascendancy in the World as the lone superpower.

LAW

PAPER-I

Constitutional and administrative Law :

1. Constitution and Constitutionalism:The distinctive features of the Constitution.
2. Fundamental Rights—Public interest litigation; Legal Aid; Legal services authority.
3. Relationship between Fundamental rights, Directive principles and Fundamental duties.
4. Constitutional Position of the President and relation with the Council of Ministers.
5. Governor and his powers.
6. Supreme Court and the High Courts:
   (a) Appointments and transfer.
   (b) Powers, functions and jurisdiction.
7. Centre, States and local bodies:
   (a) Distribution of legislative powers between the Union and the States.
   (b) Local Bodies.
   (c) Administrative relationship among Union, State and Local Bodies.
   (d) Eminent domain-State property-common property-community property.
8. Legislative powers, privileges and immunities.
9. Services under the Union and the States:

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(a) Recruitment and conditions of services;Constitutional safeguards; Administrative tribunals.

(b) Union Public Service Commission and StatePublic Service Commissions—Power andfunctions.

(c) Election Commission—Power and functions.

10. Emergency provisions.
11. Amendment of the Constitution.
12. Principle of Natural Justice—Emerging trends and judicial approach.
13. Delegated legislation and its constitutionality.
14. Separation of powers and constitutional governance.
15. Judicial review of administrative action.
16. Ombudsman: Lokayukta, Lokpal etc.

International Law :

1. Nature and Definition of International Law.
2. Relationship between International Law and Municipal Law.
3. State Recognition and State Succession.
4. **Law of the sea:** Inland Waters,Territorial Sea, Contiguous Zone, Continental Shelf, Exclusive Economic Zone and High Seas.
5. **Individuals**: Nationality, statelessness; Human Rights and procedures available for their enforcement.
6. Territorial jurisdiction of States, Extradition and Asylum.
7. **Treaties :** Formation, application, termination and reservation.
8. **United Nations** : Its principal organs, powers and functions and reform.
9. Peaceful settlement of disputes—different modes.
10. Lawful recourse to force : aggressions, self-defence, intervention.
11. Fundamental principles of international humanitarian law—International conventions and contemporary developments.
12. Legality of the use of nuclear weapons; ban on testing of nuclear weapons; Nuclear non- proliferation treaty, CTST.
13. International Terrorism, State sponsored terrorism, Hijacking, International Criminal Court.
14. New International Economic Order and Monetary Law : WTO, TRIPS, GATT, IMF, World Bank.
15. Protection and Improvement of the Human Environment : International Efforts.

PAPER II

Law of Crimes :—

1. General principles of Criminal liability : mens rea and actus reus, mens rea in statutory offences.
2. Kinds of punishment and emerging trends as to abolition of capital punishment.
3. Preparations and criminal attempt.
4. General exceptions.
5. Joint and constructive liability.

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6. Abetment.
7. Criminal conspiracy.
8. Offences against the State.
9. Offences against public tranquility.
10. Offences against human body.
11. Offences against property.
12. Offences against women.
13. Defamation.
14. Prevention of Corruption Act, 1988.
15. Protection of Civil Rights Act, 1955 and subsequent legislative developments.
16. Plea bargaining.

Law of Torts

1. Nature and definition.
2. Liability based upon fault and strict liability; Absolute liability.
3. Vicarious liability including State Liability.
4. General defences.
5. Joint tort fessors.
6. Remedies.
7. Negligence.
8. Defamation.
9. Nuisance.
10. Conspiracy.
11. False imprisonment.
12. Malicious prosecution.
13. Consumer Protection Act, 1986.

Law of Contracts and Mercantile Law

1. Nature and formation of contract/E-contract.
2. Factors vitiating free consent.
3. Void, voidable, illegal and unenforceable agreements.
4. Performance and discharge of contracts.
5. Quasi-contracts.
6. Consequences of breach of contract.
7. Contract of indemnity, guarantee and insurance.
8. Contract of agency.
9. Sale of goods and hire purchase.
10. Formation and dissolution of partnership.

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11. Negotiable Instruments Act, 1881.

12. Arbitration and Conciliation Act, 1996.

13. Standard form contracts.

Contemporary Legal Developments

1. Public Interest Litigation.

2. Intellectual property rights—Concept, types/prospects.

3. Information Technology Law including Cyber Laws—Concept, purpose/prospects.

4. Competition Law—Concept, purpose/prospects.

5. Alternate Dispute Resolution—Concept, types/prospects.

6. Major statutes concerning environmental law.

7. Right to Information Act.

8. Trial by media.

Literature of the following languages :

NOTE (i).—A candidate may be required to answer some or all the Questions in the language concerned.

NOTE (ii).—In regard to the languages included in the Eighth Schedule to Constitution, the scripts will be the same as indicated in Section II (B) of Appendix I relating to the Main Examination.

NOTE (iii).—Candidates should note that the questions not required to be answered in a specific language will have to be answered in the language medium indicated by them for answering papers on Essay, General Studies and Optional Subjects.

ASSAMESE

PAPER I

[Answers must be written in Assamese]

Section A

Language

(a) History of the origin and development of the Assamese Language —its position among the Indo-Aryan language—periods in its history.

(b) Development of Assamese prose.

(c) Vowels and consonants of the Assamese Language—Rules of phonetic changes with stress on Assamese coming down from Old Indo-Aryan.

(d) Assamese vocabulary—and its sources.

(e) Morphology of the language—conjugation—enclitic definitives and pleonastic suffixes.

(f) Dilectical divergences—the Standard colloquial and the Kamrupi dialect in particular.

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(g) Assamese script—its evolution through the ages till 19th century A.D.

Section B

Literary Criticism and Literary History

(a) Principles of literary criticism up to New criticism.

(b) Different literary genres.

(c) Development of literary forms in Assamese.

(d) Development of literary criticism in Assamese.

(e) Periods of the literary history of Assam from the earliest beginnings, i.e. from the period of the charyyageeta with their socio-cultural background : the proto Assamese Pre-Sankaradeva—Sankaradeva—Post-Sankaradeva—Modern period (from the coming of the Britishers)—Post-Independence period. Special emphasis is to be given on the Vaisnavite period, the gonaki and the post-independence periods.

PAPER II

This paper will require first-hand reading of the texts prescribed and will be designed to test the candidate's critical ability.

[Answers must be written in Assamese]

Section A

Râmâyana (Ayodhyâ Kânda	—by Madhava Kandali only)
Pârijât-Harana	—by Sankaradeva.
Râsakrîdâ	—by Sankaradeva (From Kirtana Ghosa)
Bârgeet	—by Madhavadeva.
Râjasûya	—by Madhavadeva.
Kathâ-Bhâgavata(Books I and II)	—by Baikurthanath Bhattacharyya.
Gurucarit-Kathâ (Sankaradeva's Part only)	—ed. by Maheswar Neog.

SECTION B

Mor Jeevan Soñwaran	—by Lakshminath Bezbaroa.
Kripâbar BorbaruârKakatar Topola	—by Lakshminath Bezbaroa.
Pratimâ	—by Chandra KumarAgarwalla.
Gâonburhâ	—by Padmanath GohainBarua.
Manomatî	—by Rajanikanta Bordoloi.
Purani Asamîyâ Sâhitya	—by Banikanta Kakati.
Kârengar Ligirî	—by Jyotiprasad Agarwalla
Jeevanar Bâtat	—by Bina Barva(BirinchiKumar Barua)

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Mrityunjoy —by Birendrakumar Bhattacharyya

Samrât —by Navakanta Barua

BENGALI

PAPER 1

History of Language and Literature.

[Answers must be written in Bengali]

Section A : Topics from the History of Bangla language

1. The chronological track from Proto Indo-European to Bangla (Family tree with branches and approximate dates).
2. Historical stages of Bangla (Old, Middle, New) and their linguistic features.
3. Dialects of Bangla and their distinguishing characteristics.
4. Elements of Bangla Vocabulary.
5. Forms of Bangla Literary Prose—Sadhu and Chalit.
6. Processes of language change relevant for Bangla :

   Apinihiti (Anaptyxis), Abhishruti (umlaut), Murdhanyibhavan (cerebralization), Nasikyibhavan (Nasalization), Samibhavan (Assimilation), Sadrishya (Analogy), Svaragama (Vowel insertion) —Adi Svaragama, Madhya Svaragama or Svarabhakti, Antya Svaragama, Svarasangati (Vowel harmony), y—shruti and w—shruti.
7. Problems of standardization and reform of alphabet and spelling, and those of transliteration and Romanization.
8. Phonology, Morphology and Syntax of Modern Bangla.

   (Sounds of Modern Bangla, Conjuncts; word formations, compounds; basic sentence patterns.)

Section B : Topics from the History of Bangla Literature.

1. Periodization of Bangla Literature : Old Bangla and Middle Bangla.
2. Points of difference between modern and pre-modern Bangla Literature.
3. Roots and reasons behind the emergence of modernity in Bangla Literature.
4. Evolution of various Middle Bangla forms ; Mangal Kavyas, Vaishnava lyrics, Adapted narratives (Ramayana, Mahabharata, Bhagavata) and religious biographies.
5. Secular forms in middle Bangla literature.
6. Narrative and lyric trends in the nineteenth century Bangla poetry.
7. Development of prose.
8. Bangla dramatic literature (nineteenth century, Tagore, Post-1944 Bangla drama).
9. Tagore and post-Tagoreans.
10. Fiction, major authors :

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Bankimchandra, Tagore, Saratchandra, Bibhutibhusan, Tarasankar, Manik).

11. Women and Bangla literature : creators and created.

PAPER II

Prescribed texts for close study

[**Answers must be written in Bengali]**

Section A

1. **Vaishnava Padavali** (Calcutta University)

   Poems of Vidyapati, Chandidas, Jnanadas, Govindadas and Balaramdas.

2. **Chandimangal** Kalketu episode by Mukunda (Sahitya Akademi).

3. **Chaitanya Charitamrita,** Madhya Lila by Krishnadas Kaviraj (Sahitya Akademi).

4. **Meghnadbadh Kavya** by Madhusudan Dutta.

5. **Kapalkundala** by Bankimchandra Chatterjee.

6. **Samya** and **Bangadesher Krishak** by Bankimchandra Chatterjee.

7. **Sonar Tari** by Rabindranath Tagore.

8. **Chhinnapatravali** by Rabindranath Tagore.

Section B

9. **Raktakarabi** by Rabindranath Tagore.

10. **Nabajatak** by Rabindranath Tagore.

11. **Grihadaha** by Saratchandra Chatterjee.

12. **Prabandha Samgraha,** Vol. 1, by Pramatha Choudhuri.

13. **Aranyak** by Bibhutibhusan Banerjee.

14. **Short stories** by Manik Bandyopadhyay : Atashi Mami, Pragaitihasik, Holud-Pora, Sarisrip, Haraner Natjamai, Chhoto-Bokulpurer Jatri, Kustharogir Bou, Jakey Ghush Ditey Hoy.

15. **Shrestha Kavita** by Jibanananda Das.

16. **Jagori** by Satinath Bhaduri.

17. **Ebam Indrajit** by Badal Sircar.

BODO

PAPER I

History of Bodo Language and Literature

[**Answers must be written in Bodo]**

Section A

History of Bodo Language

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1. Homeland, language family, its present status and its mutual contact with Assamese.
2. (a) phonemes : Vowel and Consonant Phonemes.
   (b) Tones.
3. Morphology : Gender, Case and Case endings, Plural suffix, Definitives, Verbal suffix.
4. Vocabulary and its sources.
5. Syntax : Types of sentences, Word Order.
6. History of scripts used in writing Bodo Language since inception.

Section B

History of Bodo Literature

1. General introduction of Bodo folk Literature.
2. Contribution of the Missionaries.
3. Periodization of Bodo Literature.
4. Critical analysis of different genre (Poetry, Novel, Short Story and Drama).
5. Translation Literature.

Paper II

The paper will require first-hand reading of the texts prescribed and will be designed to test the critical ability of the candidates.

(Answers must be written in Bodo)

Section A

(a) Khonthai-Methai
(Edited by Madaram Brahma & Rupnath Brahma)

(b) Hathorkhi-Hala
(Edited by Pramod Chandra Brahma)

(c) Boroni Gudi Sibsa Arw Aroz : Madaram Brahma

(d) Raja Nilambar : Dwarendra Nath Basumatary

(e) Bibar (prose section)
(Edited by Satish Chandra Basumatary).

Section B

(a) Bibi Bithai (Aida Nwi) : Bihuram Boro

(b) Radab : Samar Brahma Chaudhury

(c) Okhrang Gongse Nangou : Brajendra Kumar Brahma

(d) Baisagu Arw Harimu : Laksheswar Brahma

(e) Gwdan Boro : Manoranjan Lahary

(f) Jujaini Or : Chittaranjan Muchahary

(g) Mwihoor : Dharanidhar Wary

(h) Hor Badi Khwmsi : Kamal Kumar Brahma

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(i) Jaolia Dewan : Mangal Singh Hozowary

(j) Hagra Guduni Mwi : Nilkamal Brahma

DOGRI

PAPER I

HISTORY OF DOGRI LANGUAGE AND LITERATURE

(Answers must be written in Dogri)

Section A

History of Dogri Language

1. Dogri language: Origin and development through different stages.
2. Linguistic boundaries of Dogri and its dialects.
3. Characteristic features of Dogri Language.
4. Structure of Dogri Langauge:

(a) Sound Structure:

Segmental : Vowels and Consonants

Non-segmental : Length, Stress, Nasalization, Tone and Junture.

(b) Morphology of Dogri:

(i) Inflection Categories: Gender, Number, Case, Person, Tense and Voice.

(ii) Word Formation; use of prefixes, infixes and suffixes.

(iii) Vocabulary: tatsam, tadbhav, foreign and regional.

(c) Sentence Structure; Major Sentence-types and their constituents, agreement and concord in Dogri syntax.

5. Dogri Language and Scripts: Dogre/Dogra Akkhar, Devanagari and Persia.

Section B

History of Dogri Language

1. A brief account of Pre-independence Dogri Literature: Poetry & Prose.
2. Development of modern Dogri Poetry and main trends in Dogri Poetry.
3. Development of Dogri short-story, main trends and prominent short-story writers.
4. Development of Dogri Novel, main trends and contribution of Dogri Novelists.
5. Development of Dogri Drama and contribution of prominent playwrights.
6. Development of Dogri Prose; Essays, Memoirs and travelogues.
7. An introduction to Dogri Folk Literature—Folk songs, Folk tales 7 Ballads.

PAPER -II

TEXTUAL CRITICISM OF DOGRI LITERATURE

(Answers must be written in Dogri)

Section A

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Poetry

1. Azadi Paihle Di Dogri Kavita

   The following poets:

   Devi Ditta, Lakkhu, Ganga Ram, Ramdhan, Hardutt, Pahari Gandhi Baba Kanshi Ram & Permanand Almast

2. Modern Dogri Poetry

   Azadi Bad Di Dogri Kavita

   The following poets :

   Kishan Smailpuri, Tara Smailpuri, Mohan Lal Sapolia, Yash Sharma, K.S. Madhukar, Padma Sachdev, Jitendra Udhampuri, Charan Singh and Prakash Premi

3. Sheeraza Dogri Number 102, Ghazal Ank

   The following poets :

   Ram Lal Sharma, Ved Pal Deep, N.D. Jamwal, Shiv Ram Deep, Ashwini Magotra and Virendra Kesar

4. Sheeraza Dogri Number 147, Ghazal Ank

   The following poets:

   R.N. Shastri, Jitendra Udhampuri, Champa Sharma and Darshan Darshi.

5. Ramayan (Epic) by Shambhu Nath Sharma (up to Ayodhya Kand)
6. Veer Gulab (Khand Kavya) by Dinoo Bhai Pant.

Section B

Prose

1. Ajakani Dogri Kahani

   The following Short Story Writers :

   Madan Mohan Sharma, Narendra Khajuri and B.P. Sathe

2. Ajakani Dogri Kahani Part-II

   The following Short Story Writers :

   Ved Rahi, Narsingh Dev Jamwal, Om Goswami, Chahttrapal, Lalit Magotra, Chaman Arora and Ratan Kesar.

3. Khatha Kunj Bhag II

   The following Story Writers :

   Om Vidyarthi, Champa Sharma and Krishan Sharma.

4. Meel Patthar (collection of short stories) by Bandhu Sharma.
5. Kaiddi (Novel) by Desh Bandhu Dogra Nutan.
6. Nanga Rukkh (Novel) by O.P. Sharma Sarathi.
7. Nayaan (Drama) by Mohan Singh.
8. Satrang (A collection of one act plays).

   The following play wrights :

   Vishwa Nath Khajuria, Ram Nath Shastri, Jitendra Sharma, Lalit Magotra and Madan Mohan Sharma.

9. Dogri Lalit Nibandh

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The following authors:

Vishwa Nath Khajuria, Narayan Mishra, Balkrishan Shastri, Shiv Nath, Shyam Lal Sharma, Lakshmi Narayan, D.C. Prashant, Ved Ghai, Kunwar Viyogi.

ENGLISH

The syllabus consists of two papers, designed to test a first-hand and critical reading of texts prescribed from the following periods in English Literature : Paper 1 : 1600-1900 and Paper 2 : 1900–1990.

There will be two compulsory questions in each paper : (a) A short-notes question related to the topics for general study, and (b) A critical analysis of UNSEEN passages both in prose and verse.

PAPER I

(Answers must be written in English)

Texts for detailed study are listed below. Candidates will also be required to show adequate knowledge of the following topics and movements :

The Renaissance; Elizabethan and Jacobean Drama; Metaphysical Poetry; The Epic and the Mock-epic; Neo-classicism; Satire; The Romantic Movement; The Rise of the Novel; The Victorian Age.

Section A

1. William Shakespeare : King Lear and The Tempest.
2. John Donne. The following poems :
   –Canonization;
   –Death be not proud;
   –The Good Morrow;
   –On his Mistress going to bed;
   –The Relic;
3. John Milton : Paradise Lost, I, II, IV, IX.
4. Alexander Pope. The Rape of the Lock.
5. William Wordsworth. The following poems :
   – Ode on Intimations of Immortality.
   – Tintern Abbey.
   – Three years she grew.
   – She dwelt among untrodden ways.
   – Michael.
   – Resolution and Independence.
   – The World is too much with us.
   – Milton, thou shouldst be living at this hour.
   – Upon Westminster Bridge.
6. Alfred Tennyson : In Memoriam.
7. Henrik Ibsen : A Doll's House.

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Section B

1. Jonathan Swift, Gulliver's Travels.
2. Jane Austen. Pride and Prejudice.
3. Henry Fielding. Tom Jones.
4. Charles Dickens. Hard Times.
5. George Eliot. The Mill on the Floss.
6. Thomas Hardy. Tess of the d'Urbervilles.
7. Mark Twain. The Adventures of Huckleberry Finn.

PAPER II

(Answers must be written in English)

Texts for detailed study are listed below. Candidates will also be required to show adequate knowledge of the following topics and movements :

Modernism; Poets of the Thirties; The stream-of-consciousness Novel; Absurd Drama; Colonialism and Post-Colonialism; Indian Writing in English; Marxist, Psychoanalytical and Feminist approaches to literature; Post-Modernism.

Section A

1. William Butler Yeats. The following poems :
   - Easter 1916.
   - The Second Coming.
   - A Prayer for my daughter.
   - Sailing to Byzantium.
   - The Tower.
   - Among School Children.
   - Leda and the Swan.
   - Meru.
   - Lapis Lazuli.
   - The Second Coming.
   - Byzantium.
2. T.S. Eliot. The following poems :
   - The Love Song of J. Alfred Prufrock.
   - Journey of the Magi.
   - Burnt Norton.
3. W.H. Auden. The following poems :
   - Partition
   - Musee des Beaux Arts
   - In Memory of W.B. Yeats

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- Lay your sleeping head, my love
- The Unknown Citizen
- Consider
- Mundus Et Infans
- The Shield of Achilles
- September 1, 1939
- Petition

4. John Osborne : Look Back in Anger.
5. Samuel Beckett. Waiting for Godot.
6. Philip Larkin. The following poems :
   - Next
   - Please
   - Deceptions
   - Afternoons
   - Days
   - Mr. Bleaney
7. A.K. Ramanujan. The following poems :
   - Looking for a Cousin on a Swing
   - A River
   - Of Mothers, among other Things
   - Love Poem for a Wife 1
   - Small-Scale Reflections on a Great House
   - Obituary

(All these poems are available in the anthology Ten Twentieth Century Indian Poets, edited by R. Parthasarthy, published by Oxford University Press, New Delhi).

Section B

1. Joseph Conrad. Lord Jim.
2. James Joyce. Portrait of the Artist as a Young Man.
3. D.H. Lawrence. Sons and Lovers.
4. E.M. Forster. A Passage to India.
5. Virginia Woolf. Mrs. Dalloway.
6. Raja Rao. Kanthapura.
7. V.S. Naipaul. A House for Mr. Biswas.

GUJARATI

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PAPER I

(Answers must be written in Gujarati)

Section A

Gujarati Language : Form and History

(1) History of Gujarati Language with special reference to New Indo-Aryan i.e. last one thousand years.

(2) Significant features of the Gujarati language : phonology, morphology and syntax.

(3) Major dialects : Surti, pattani, charotari and Saurashtri.

History of Gujarati literature

Medieval :

4. Jaina tradition
5. Bhakti tradition : Sagun and Nirgun (Jnanmargi)
6. Non-sectarian tradition (Laukik parampara)

Modern :

7. Sudharak yug
8. Pandit yug
9. Gandhi yug
10. Anu-Gandhi yug
11. Adhunik yug

Section B

Literary Forms : (Salient features, history and development of the following literary forms :)

(a) **Medieval**

1. Narratives : Rasa, Akhyan and Padyavarta
2. Lyrical: Pada

(b) **Folk**

3. Bhavai

(c) **Modern**

4. Fiction : Novel and Short Story
5. Drama
6. Literary Essay
7. Lyrical Poetry

(d) **Criticism**

8. History of theoretical Gujarati criticism
9. Recent research in folk tradition.

PAPER II

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(Answers must be written in Gujarati)

The paper will require first-hand reading of the texts prescribed and will be designed to test the critical ability of the candidate.

Section A

1. **Medieval**

(i) Vasantvilas phagu—AJNATKRUT

(ii) Kadambari—BHALAN

(iii) Sudamacharitra—PREMANAND

(iv) Chandrachandravatini varta—SHAMAL

(v) Akhegeeta—AKHO

2. **Sudharakyug & Pandityug**

(vi) Mari Hakikat—NARMADASHA

(vii) Farbasveerah—DALPATRAM

(viii) Saraswatichandra-Part 1—GOVARDHANRAM TRIPATHI

(ix) Purvalap—'KANT' (MANISHANKAR RATNAJI BHATT)

(x) Raino Parvat—RAMANBHAI NEELKANTH

Section B

1. **Gandhiyug & Anu Gandhiyug**

(i) Hind Swaraj—MOHANDAS KARAMCHAND GANDHI

(ii) Patanni Prabhuta—KANHAIYALAL MUNSHI

(iii) Kavyani Shakti—RAMNARAYAN VISHWANATH PATHAK

(iv) Saurashtrani Rasdhar-Part 1—ZAVERCHAND MEGHANI

(v) Manvini Bhavai—PANNALAL PATEL

(vi) Dhvani—RAJENDRA SHAH

2. **Adhunik yug**

(vii) Saptapadi—UMASHANKAR JOSHI

(viii) Janantike—SURESH JOSHI

(ix) Ashwatthama—SITANSHU YASHASCHANDRA.

HINDI

PAPER I

(Answers must be written in Hindi)

Section A

1. History of Hindi Language and Nagari Lipi

I. Grammatical and applied forms of Apbhransh, Awahatta & Arambhik Hindi.

II. Development of Braj and Awadhi as Literary language during medieval period.

III. Early form of Khari-boli in Siddha-Nath Sahitya, Khusero, Sant Sahitaya, Rahim etc. and Dakhni Hindi.

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IV. Development of Khari-boli and Nagari Lipi during 19th Century.

V. Standardisation of Hindi Bhasha & Nagari Lipi.

VI. Development of Hindi as a National Language during freedom movement.

VII. The development of Hindi as a National Language of Union of India.

VIII. Scientific & Technical Development of Hindi Language.

IX. Prominent dialects of Hindi and their inter-relationship.

X. Salient features of Nagari Lipi and the efforts for its reform & Standard form of Hindi.

XI. Grammatical structure of Standard Hindi.

Section B

2. **History of Hindi Literature**

I. The relevance and importance of Hindi literature and tradition of writing History of Hindi Literature.

II. Literary trends of the following four periods of history of Hindi Literature.

A : Adikal—Sidh, Nath and Raso Sahitya.
Prominent poets—Chandvardai, Khusaro, Hemchandra, Vidyapati.

B : Bhaktikal—Sant Kavyadhara, Sufi Kavyadhara, Krishna Bhaktidhara and Ram Bhaktidhara.

Prominent Poets—Kabir, Jayasi, Sur & Tulsi.

C : Ritikal—Ritikavya, Ritibaddhkavya & Riti Mukta Kavya. Prominent Poets—Keshav, Bihari, Padmakar and Ghananand.

D : Adhunik Kal—

a. Renaissance, the development of Prose, Bharatendu Mandal.

b. Prominent Writers—Bharatendu, Bal Krishna Bhatt & Pratap Narain Mishra.

c. Prominent trends of modern Hindi Poetry: Chhayavad, Pragativad, Prayogvad, Nai Kavita, Navgeet and Contemporary poetry and Janvadi Kavita.

Prominent Poets—Maithili Sharan Gupta, Prasad, Nirala, Mahadevi, Dinkar, Agyeya, Muktibodh, Nagarjun.

3. Katha Sahitya

B

A : Upanyas & Realism

B : The origin and development of Hindi Novels.

C : ProminentNovelists—Premchand, Jain-endra, Yashpal, Renu and Bhism Sahani.

D : The origin and development of Hindi short story.

E : Prominent Short Story Writers—Premchand, Prasad, Agyeya, Mohan Rakesh & Krishna Sobti.

4. Drama & Theatre

A : The Origin & Development of Hindi Drama.

B : Prominent Dramatists—Bharatendu, Prasad, Jagdish Chandra Mathur, Ram Kumar Verma, Mohan Rakesh.

C : The development of Hindi Theatre.

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For more job news visit : www.kpscvaani.com

5. Criticism

A : The origin and development of Hindi criticism : Saiddhantik, Vyavharik, Pragativadi. Manovishleshanvadi & Nai Alochana.

B : Prominent critics—Ramchandra Shukla, Hajari Prasad Dwivedi, Ram Vilas Sharma & Nagendra.

6. The other form of Hindi prose—Lalit Nibandh,Rekhachitra, Sansmaran, Yatra-vrittant.

PAPER II

(Answers must be written in Hindi)

The paper will require first-hand reading of the prescribed texts and will test the critical ability of the candidates.

Section A

1.	Kabir	:	Kabir Granthawali, Ed. Shyam Sundar Das (First hundred Sakhis)
2.	Soordas	:	Bhramar Geetsar, Ed. Ramchandra Shukla (First hundred Padas)
3.	Tulsidas	:	Ramcharit Manas (Sundar Kand) Kavitawali (Uttarkand)
4.	Jayasi	:	Padmawat Ed. Shyam Sundar Das (Sinhal Dwip Khand & Nagmativiyog Khand)
5.	Bihari	:	Bihari Ratnakar Ed. Jagnnath Prasad Ratnakar (First 100 Dohas)
6.	Maithili Sharan Gupta	:	Bharat Bharati
7.	Prasad	:	Kamayani (Chinta and Shraddha Sarg)
8.	Nirala	:	Rag-Virag, Ed. Ram Vilas Sharma (Ram Ki Shakti Pooja & Kukurmutta)
9.	Dinkar	:	Kurukshetra
10.	Agyeya	:	Angan Ke Par Dwar (Asadhya Veena)
11.	Muktiboth	:	Brahm Rakhashas
12.	Nagarjun	:	Badal Ko Ghirte Dekha Hai, Akal Ke Bad, Harijan Gatha.

Section B

1.	Bharatendu	:	Bharat Durdasha
2.	Mohan Rakesh	:	Ashadh Ka Ek Din
3.	Ramchandra	:	Chintamani (Part I) (KavitaKya Shukla Hai, ShraddhaAurBhakti)
4.	Dr. Satyendra	:	Nibandh Nilaya—Bal Krishna Bhatt, Premchand, Gulab Rai, Hajari Prasad Dwivedi, Ram Vilas Sharma, Agyeya, Kuber Nath Rai.
5.	Premchand	:	Godan, Premchand ki Sarvashreshtha Kahaniyan, Ed. Amrit Rai/Manjusha—Prem Chand ki Sarvashreshtha Kahaniyan. Ed. Amrit Rai.
6.	Prasad	:	Skandgupta
7.	Yashpal	:	Divya
8.	Phaniswar Nath Renu	:	Maila Anchal
9.	Mannu Bhandari	:	Mahabhoj

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10. Rajendra Yadav : Ek Dunia Samanantar (All Stories)

KANNADA

PAPER-I

(Answers must be written in Kannada)

Section A

A. **History of Kannada Language**

What is Language ? General characteristics of Language. Dravidian Family of Languages and its specific features. Antiquity of Kannada Language. Different phases of its Development.

Dialects of Kannada Language : Regional and Social. Various aspects of developments of Kannada Language: phonological and Semantic changes. Language borrowing.

B. **History of Kannada Literature**

Ancient Kannada literature : Influence and Trends, Poets for study : Specified poets from Pampa to Ratnakara Varni are to be studied in the light of contents, form and expression : Pampa, Janna, Nagachandra.

Medieval Kannada literature : Influence and Trends.

Vachana Literature : Basavanna, Akka Mahadevi.

Medieval Poets : Harihara, Raghavanka, Kumara-Vyasa.

Dasa literature : Purandara and Kanaka.

Sangataya : Ratnakarvarni

C. Modern Kannada literature : Influence, trends and ideologies, Navodaya, Pragatishila, Navya, Dalita and Bandaya.

Section B

A. **Poetics and Literary Criticism**

Definition and concepts of poetry; Word, Meaning, Alankara, Reeti, Rasa, Dhwani, Auchitya.

Interpretations of Rasa Sutra. Modern Trends of literary criticism : Formalist, Historical, Marxist, Feminist, Post-colonial criticism.

B. **Cultural History of Karnataka**

Contribution of Dynasties to the culture of Karnataka: Chalukyas of Badami and Kalyani, Rashtrakutas, Hoysalas, Vijayanagara rulers, in literary context.

Major religions of Karnataka and their cultural contribution.

Arts of Karnataka ; Sculpture, Architecture, Painting, Music, Dance—in the literary context.

Unification of Karnataka and its impact of Kannada literature.

PAPER-II

(Answers must be written in Kannada)

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The Paper will require first-hand reading of the Texts prescribed and will be designed to test the critical ability of the candidates.

Section A

A. Old Kannada Literature

1. Vikramaarjuna Vijaya of Pampa (Cantos 12 & 13), (Mysore University Pub.)
2. Vaddaraadhane (Sukumaraswamyia Kathe, Vidyutchorana Kathe)

B. **Medieval Kannada Literature**

1. Vachana, Kammata, Ed. K. Marulasiddappa K.R. Nagaraj (Bangalore University Pub.)
2. Janapriya Kanakasamputa, Ed. D. Javare Gowda (Kannada and Culture Directorate, Bangalore)
3. Nambiyannana Ragale, Ed., T.N. Sreekantaiah (Ta. Vem. Smaraka Grantha Male, Mysore)
4. Kumaravyasa Bharata : Karna Parva (Mysore University)
5. Bharatesha Vaibhava Sangraha Ed Ta. Su. Shama Rao (Mysore University)

Section B

A. **Modern Kannada Literature**

1. Poetry	:	Hosagannada Kavite, Ed. G.H. Nayak (Kannada Saahitya Parishattu, Bangalore)
2. Novel	:	Bettada Jeeva—Shivarama Karanta Madhavi—Anupama NiranjanaOdalaala-Deva-nuru Mahadeva
3. Short Story	:	Kannada Sanna Kathegalu, Ed. G.H. Nayak (Sahitya Academy, New Delhi)
4. Drama	:	Shudra Tapaswi—Kuvempu. Tughalak—Girish Karnad.
5. Vichara Sahitya	:	Devaru—A.N. Moorty Rao (Pub: D.V.K.Moorty, Mysore.)

B. **Folk Literature :**

1. Janapada Swaroopa—Dr. H.M. Nayak. (Ta. Vem. Smaraka Grantha Male, Mysore.)
2. Janpada Geetaanjali—Ed. D. Javare Gowda.(Pub : Sahitya Academy, New Delhi).
3. Kannada Janapada Kathegalu—Ed. J.S. Paramashiviaah (Mysore University).
4. Beedi Makkalu Beledo. Ed. Kalegowda Nagavara (Pub : Bangalore University).
5. Savirada Ogatugalu—Ed. S.G. Imrapura.

KASHMIRI

PAPER-I

(Answers must be written in Kashmiri)

Section A

1. Genealogical relationship of the Kashmiri language: various theories.
2. Areas of occurence and dialects (geographical/social)

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3. Phonology and grammar:

   i. Vowel and consonant system;

   ii. Nouns and pronouns with various case inflections;

   iii. Verbs: various types and tenses.

4. Syntactic structure:

   i. Simple, active and declarative statements;

   ii. Coordination;

   iii. Relativisation.

Section B

1. Kashmiri literature in the 14th century (Socio-cultural and intellectual background with special reference to *Lal Dyad* and *Sheikhul Alam).*
2. Nineteenth century Kashmiri literature (development of various genres : vatsun; ghazal and mathnavi.
3. Kashmiri literature in the first half of the twentieth century (with special reference to Mahjoor and Azad; various literary influences).
4. Modern Kashmiri literature (with special reference to the development of the short story, drama, novel and nazm).

PAPER-II

(Answers must be written in Kashmiri)

Section A

1. Intensive study of Kashmiri poetry up to the nineteenth century :

   (i) Lal Dyad,

   (ii) Sheikhul Aalam

   (iii) Habba Khatoon

2. Kashmiri poetry : 19th Century

   (i) Mahmood Gami (Vatsans)

   (ii) Maqbool shah (Gulrez)

   (iii) Rasool Mir (Ghazals)

   (iv) Abdul Ahad Nadim (N'at)

   (v) Krishanjoo Razdan (Shiv Lagun)

   (vi) Sufi Poets (Test in Sanglaab, published by the Deptt. of Kashmiri, University of Kashmir)

3. Twentieth Century Kashmiri poetry (text in Azich Kashir Shairi, published by the Deptt. of Kashmiri, University of Kashmir).
4. Literary criticism and research work : development and various trends.

Section B

1. An analytical study of the short story in Kashmiri.

   (i) Afsana Majmu'a, published by the Deptt. of Kashmiri, University of Kashmir.

   (ii) Kashur Afsana Az, published by the Sahitya Akademi.

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(iii) Hamasar Kashur Afsana, published by the Sahitya Akademi.

The following short story writers only : Akhtar Mohi-ud Din, Kamil, Hari Krishan Kaul, Hraday Kaul Bharti, Bansi Nirdosh, Gulshan Majid.

2. Novel in Kashmiri :

(i) Mujrim by G. N. Gowhar

(ii) Marun—Ivan Ilyichun, (Kashmiri version of Tolstoy's) The Death of Ivan Ilyich (published by Kashmiri Deptt.)

3. Drama in Kashmiri :

(i) Natuk Kariv Band by Hari Krishan Kaul

(ii) Qk Angy Natuk, ed. Motilal Keemu, published by the Sahitya Akademi.

(iii) Razi Oedipus, tr. Naji Munawar, published by the Sahitya Akademi.

4. Kashmiri Folk Literature :

(i) Kashur Luki Theatre by Mohammad Subhan Bhagat,published by the Deptt. of Kashmiri, University of Kashmir.

(ii) Kashiry Luki Beeth (all volumes) published by the J&K Cultural Akademy.

KONKANI

PAPER -I

(Answers must be written in Konkani)

Section A

History of the Konkani Language :

(i) Origin and development of the language and influences on it.

(ii) Major variants of Konkani and their linguistic features.

(iii) Grammatical and lexicographic work in Konkani, including a study of cases, adverbs, indeclinables and voices.

(iv) Old Standard Konkani, New Standard and Standardisation problems.

Section B

History of Konkani Literature

Candidates would be expected to be well-acquainted with Konkani literature and its social and cultural background and consider the problems and issues arising out of them.

(i) History of Konkani literature from its probable source to the present times, with emphasis on its major works, writers and movements.

(ii) Social and cultural background of the making of Konkani literature from time to time.

(iii) Indian and Western influences on Konkani literature, from the earliest to modern times.

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(iv) Modern literary trends in the various genres and regions including a study of Konkani folklore.

PAPER-II

(Answers must be written in Konkani)

Textual Criticism of Konkani Literature

The paper will be designed to test the candidate's critical and analytical abilities. Candidates would be expected to be well-acquainted with Konkani Literature and required to have first-hand reading of the following texts :

Section A : Prose

1. (a) Konkani Mansagangotri (excluding poetry) ed. by Prof : Olivinho Gomes.
   (b) Old Konkani language and literature—the Portuguese Role
2. (a) Otmo Denvcharak—a novel by A. V. da Cruz.
   (b) Vadoll ani Varem—a novel by Antonio Pereira.
   (c) Devache Kurpen—a novel by V.J.P. Saldanha.
3. (a) Vajralikhani—Shenoy goem-bab-An anthology-ed. by Shantaram Varde Valavalikar.
   (b) Konkani Lalit Niband—Essays-ed. by Shyam Verenkar.
   (c) Teen Dasakam—An anthology—ed. by Chandrakant Keni.
4. (a) Demand—Drama-by Pundalik Naik.
   (b) Kadambini: A Miscellany of Modern Prose—ed. by Prof. O.J.F. Gomes and Smt. P.S. Tadkodkar.
   (c) Ratha Tujeo Ghudieo—by Smt. Jayanti Naik.

Section B : Poetry

1. (a) Ev ani Mori : Poetry by Eduardo Bruno de Souza.
   (b) Abravanchem Yadnyadan—by Luis Mascarenhas.
2. (a) Godde Ramayan—ed. by R.K. Rao.
   (b) Ratnahar I and II—collection of poems—ed. R. V. Pandit.
3. (a) Zayo Zuyo—poems- Manohar L. Sardessai.
   (b) Kanadi Mati Konkani Kavi—Anthology ofPoems—ed. Pratap Naik.
4. (a) Adrushatache Kalle—Poems by Pandurang Bhangui.
   (b) Yaman—Poems by Madhav Borkar.

MAITHILI

PAPER I

HISTORY OF MAITHILI LANGUAGE AND ITS LITERATURE

(Answers must be written in Maithili)

PART A

History of Maithili Language

1. Place of Maithili in Indo-European Language family.
2. Origin and development of Maithili language. (Sanskrit, Prakrit, Avhatt, Maithili)

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3. Periodic division of Maithili Language. (Beginning, Middle era, Modern era).
4. Maithili and its different dialects.
5. Relationship between Maithili and other Eastern languages (Bengali, Asamese, Oriya)
6. Origin and Development of Tirhuta Script.
7. Pronouns and Verbs in Maithili Language.

PART B

History of Maithili Literature

1. Background of Maithili Literature (Religious, Economic, Social, Cultural).
2. Periodic division of Maithili literature.
3. Pre-Vidyapati Literature.
4. Vidyapati and his tradition.
5. Medieval Maithili Drama (Kirtaniya Natak, Ankia Nat, Maithili dramas written in Nepal).
6. Maithili Folk Literature (Folk Tales, Folk Drama, Folk Stories, Folk Songs).
7. Development of different literary forms in modern era :
   (a) Prabandh-kavya
   (b) Muktak-kavya
   (c) Novel
   (d) Short Story
   (e) Drama
   (f) Essay
   (g) Criticism
   (h) Memoirs
   (i) Translation
8. Development of Maithili Magazines and Journals.

PAPER -II

(Answers must be written in Maithili)

The paper will require first-hand reading of the prescribed texts and will test the critical ability of the candidates.

PART A

Poetry

1. Vidyapati Geet-Shati—Publisher : Sahitya Akademi, New Delhi (Lyrics— 1 to 50)
2. Govind Das Bhajanavali—Publisher : Maithili Acadamy, Patna (Lyrics— 1 to 25)
3. Krishnajanm—Manbodh
4. Mithilabhasha Ramayana—Chanda Jha (only Sunder-Kand)
5. Rameshwar Charit Mithila Ramayan—Lal Das (only Bal-kand)
6. Keechak-Vadh—Tantra Nath Jha.
7. Datta-Vati—Surendra Jah 'Suman' (only 1st and 2nd Cantos).
8. Chitra-Yatri
9. Samakaleen Maithili Kavita—Publisher: Sahitaya Akademi, New Delhi.

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PART-B

10. Varna Ratnakar—Jyotirishwar (only 2nd Kallol)
11. Khattar Kakak Tarang—Hari Mohan Jha
12. Lorik—Vijaya Manipadma
13. Prithvi Putra—Lalit
14. Bhaphait Chahak Jinagi—Sudhanshu 'Shekhar' Choudhary
15. Kriti Rajkamlak—Publisher: Maithili Acadamy, Patna (First Ten Stories only)
16. Katha–Sangrah–Publisher: Maithili Acadamy, Patna.

MALAYALAM

PAPER-I

(Answers must be written in Malayalam)

Section A

1—Early phase of Malayalam Language :

1.1 Various theories : Origin from proto Dravidian, Tamil, Sanskrit.

1.2 Relation between Tamil and Malayalam : Six nayas of A. R. Rajarajavarma.

1.3 Pattu School—Definition, Ramacharitam, later pattu works—Niranam works and Krishnagatha.

2—Linguistic features of :

2.1 Manipravalam—definition. Language of early manipravala works—Champu, Sandesakavya, Chandrotsava, minor works. Later manipravala works—medieval Champu and Attakkatha.

2.2 Folklore—Southern and Northern ballads, Mappila songs.

2.3 Early Malayalam Prose—Bhashakautaliyam, Brahmandapuranam, Attaprakaram, Kramadipika and Nambiantamil.

3—Standardisation of Malayalam :

3.1 Peculiarities of the language of Pana, Kilippattu and Tullal.

3.2 Contributions of indigenous and European missionaries to Malayalam.

3.3 Characteristics of contemporary Malayalam; Malayalam as administrative language. Language of scientific and technical literature—media language.

Section B

LITERARY HISTORY

4—Ancient and Medieval Literature :

4.1 Pattu—Ramacharitam, Niranam Works and Krishnagatha.

4.2 Manipravalam—early and medieval manipravala works including attakkatha and champu.

4.3 Folk Literature.

4.4 Kilippattu, Tullal and Mahakavya.

5—Modern Literature—Poetry :

5.1 Venmani poets and contemporaries.

5.2 The advent of Romanticism—Poetry of Kavitraya i.e., Asan, Ulloor and Vallathol.

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5.3 Poetry after Kavitraya.

5.4 Modernism in Malayalam Poetry.

6—Modern Literature—Prose :

6.1 Drama.

6.2 Novel.

6.3 Short story.

6.4 Biography, travelogue, essay and criticism.

PAPER-II

(Answers must be written in Malayalam)

This paper will require first hand reading of the texts prescribed and is designed to test the candidate's critical ability.

Section A

Unit 1

1.1 Ramacharitam—Patalam 1.

1.2 Kannassaramayanam—Balakandam first 25 stanzas.

1.3 Unnunilisandesam—Purvabhagam 25 slokas including Prastavana.

1.4 Mahabharatham Kilippattu—Bhishmaparvam.

Unit 2

2.1 Kumaran Asan—Chintavisthayaya Sita.

2.2 Vailoppilli—Kutiyozhikkal.

2.3 G. Sankara Kurup—Perunthachan.

2.4 N. V. Krishna Variar—Tivandiyile pattu.

Unit 3

3.1 O. N. V.—Bhumikkoru Charamagitam.

3.2 Ayyappa Panicker—Kurukshetram.

3.3 Akkittam—Pandatha Messanthi.

3.4 Attur Ravivarma—Megharupan.

Section B

Unit 4

4.1 O. Chanthu Menon—Indulekha.

4.2 Thakazhy—Chemmin.

4.3 O. V. Vijayan—Khasakkinte Ithihasam.

Unit 5

5.1 M. T. Vasudevan Nair—Vanaprastham (Collection).

5.2 N. S. Madhavan—Higvitta (Collection).

5.3 C. J. Thomas—1128-il Crime 27.

Unit 6

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6.1 Kuttikrishna Marar—Bharataparyatanam.

6.2 M. K. Sanu—Nakshatrangalute Snehabhajanam.

6.3 V. T. Bhatttathirippad—Kannirum Kinavum.

MANIPURI

PAPER-I

(Answers must be written in Manipuri)

Section A

Language :

(a) General characteristics of Manipuri Language and history of its development; its importance and status among the Tibeto-Burman Languages of North-East India; recent development in the study of Manipuri Language; evolution and study of old Manipuri script.

(b) Significant features of Manipuri Language :

(i) Phonology : Phoneme-vowels, consonants juncture, tone, consonant cluster and its occurrence, syllable-its structure, pattern and types.

(ii) Morphology : Word-class, root and its types; affix and its types; grammatical categories-gender, number, person, case, tense and aspects, process of compounding (samas and sandhi).

(iii) Syntax : Word order; types of sentences, phrase and clause structures.

Section B

(a) Literary History of Manipuri :

Early period (up to 17th Century)–Social and cultural background; Themes, diction and style of the works.

Medieval period (18th and 19th Century)-Social, religious and political background; Themes, diction and style of the works.

Modern period-Growth of major literary forms; change of Themes, diction and style.

(b) Manipuri Folk Literature :

Legend, Folktale, Folksong, Ballad, Proverb and Riddle.

(c) Aspects of Manipuri Culture :

Pre-Hindu Manipuri Faith; Advent of Hinduism and the process of syncreticism;

Performing arts-Lai Haraoba, Maha Ras;

Indegenous games-Sagol Kangjei, Khong Kangjei, Kang.

PAPER-II

(Answers must be written in Manipuri)

This paper will require first hand reading of the texts prescribed and will be designed to test candidate's critical ability to assess them.

Section A

Old and Medieval Manipuri Literature :

(a) **Old Manipuri Literature :**

1. O. Bhogeswar Singh (Ed.) : Numit Kappa

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2. M. Gourachandra Singh (Ed.) : Thawanthaba Hiran
3. N. Khelchandra Singh (Ed.) : Naothingkhong Phambal Kaba
4. M. Chandra Singh (Ed.) : Panthoibi Khonggul

(b) **Medieval Manipuri Literature :**

1. M. Chandra Singh (Ed.) : Samsok Ngamba
2. R.K. Snahal Singh (Ed.) : Ramayana Adi Kanda
3. N. Khelchandra Singh (Ed.) : Dhananjoy Laibu Ningba
4. O. Bhogeswar Singh (Ed.) : Chandrakirti Jila Changba

Section B

Modern Manipuri Literature :

(a) **Poetry and Epic :**

(I) Poetry :

(a) Manipuri Sheireng (Pub) Manipuri Sahitya Parishad, 1998 (Ed.)

Kh. Chaoba Singh : Pi Thadoi, Lamgi CheklaAmada, Loktak
Dr. L. Kamal Singh : Nirjanata, Nirab Rajani
A. Minaketan Singh : Kamalda, Nonggumlalkkhoda.
L. Samarendra Singh : Ingagi Nong, Mamang Leikai Thambal Satle
E. Nilakanta Singh : Manipur, Lamangnaba
Shri Biren : Tangkhul Hui
Th. Ibopishak : Anouba Thunglaba Jiba.

(b) Kanchi Sheireng. (Pub) Manipur University 1998 (Ed.)

Dr. L. Kamal Singh : Biswa-Prem
Shri Biren : Chaphadraba Laigi Yen
Th. Ibopishak : Norok Patal Prithivi

(II) Epic :

1. A. Dorendrajit Singh : Kansa Bodha
2. H. Anganghal Singh : Khamba-Thoibi Sheireng(San-Senba, Lei Langba,Shamu Khonggi Bichar)

(III) Drama :

1. S. Lalit Singh : Areppa Marup
2. G.C. Tongbra : Matric Pass
3. A. Samarendra : Judge Saheb ki Imung

(b) Novel, Short-story and Prose :

(I) **Novel :**

1. Dr. L. Kamal Singh : Madhabi
2. H. Anganghal Singh : Jahera
3. H. Guno Singh : Laman

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4. Pacha Meetei : Imphal Amasung, MagiIshing, Nungsitki Phibam

(II) Short-story :

(a) Kanchi Warimacha (Pub) Manipur University 1997(Ed.)

R.K. Shitaljit Singh : Kamala Kamala

M.K. Binodini : Eigi Thahoudraba HeitupLalu

Kh. Prakash : Wanom Shareng

(b) Parishadki Khangatlaba Warimacha (Pub) Manipuri Sahitya Parishad 1994 (Ed.)

S. Nilbir Shastri : Loukhatpa

R.K. Elangba : Karinunggi

(c) Anouba Manipuri Warimacha (Pub) The Cultural Forum Manipur 1992 (Ed.)

N. Kunjamohon Singh : Ijat Tanba

E. Dinamani : Nongthak Khongnang

(III) Prose :

(a) Warenggi Saklon [Due Part] (Pub) The Cultural Forum Manipur 1992 (Ed.)

Kh. Chaoba Singh : Khamba-Thoibigi WariAmasung Mahakavya

(b) Kanchi Wareng (Pub) Manipur University, 1998 (Ed.)

B. Manisana Shastri : Phajaba

Ch. Manihar Singh : Lai-Haraoba

(c) Apunba Wareng (Pub) Manipur University, 1986 (Ed.)

Ch. Pishak Singh : Samaj Amasung Sanskriti

M.K. Binodini : Thoibidu Warouhouida

Eric Newton : Kalagi Mahousa (translated by I.R. Babu)

(d) Manipuri Wareng (Pub) The Cultural Forum Manipur 1999 (Ed.)

S. Krishnamohan Singh : Lan

MARATHI

PAPER-I

(Answers must be written in Marathi)

Section A

Language and Folk-lore

(a) Nature and Functions of Language
(with reference to Marathi)

Language as a signifying system : Langue and Parole; Basic functions; Poetic Language; Standard Language and dialect; Language variations according to social parameters.

Linguistic features of Marathi in thirteenth century and seventeenth century.

(b) Dialects of Marathi

Ahirani; Varhadi; Dangi.

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(c) Marathi Grammar

Parts of Speech; Case-system; Prayog-vichar (Voice).

(d) Nature and kinds of Folk-lore
(with special reference to Marathi)

Lok-Geet, Lok Katha, Lok Natya.

Section B

(History of Literature and Literary Criticism)

(a) History of Marathi Literature

1. From beginning to 1818 AD, with special reference to the following : The Mahanubhava writers, the Varkari poets, the Pandit poets, the Shahirs, Bakhar Literature.

2. From 1850 to 1990, with special reference to developments in the following major forms : Poetry, Fiction (Novel and Short Story), Drama; and major literary currents and movements, Romantic, Realist, Modernist, Dalit, Gramin, Feminist.

(b) Literary Criticism

1. Nature and function of Literature;

2. Evaluation of Literature;

3. Nature, Objectives and Methods of Criticism;

4. Literature, Culture and Society.

PAPER-II

(Answer must be written in Marathi)

Textual study of prescribed literary works.

The paper will require first-hand reading of the texts prescribed and will be designed to test the candidate's critical ability.

Section A

(Prose)

(1) 'Smritisthala'

(2) Mahatma Jotiba Phule
"Shetkaryacha Asud'
'Sarvajanik Satyadharma'

(3) S.V. Ketkar
'Brahmankanya'

(4) P.K. Atre
'Sashtang Namaskar'

(5) Sharchchandra Muktibodh
'Jana Hey Volatu Jethe'

(6) Uddhav Shelke
'Shilan'

(7) Baburao Bagul
'Jevha Mi Jaat Chorli Hoti'

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(8) Gouri Deshpande
'Ekek Paan Galavaya'

(9) P.I. Sonkamble
'Athavaninche Pakshi'

Section B

(Poetry)

(1) 'Namadevanchi Abhangawani'
Ed: Inamdar, Relekar, Mirajkar
Modern Book Depot, Pune

(2) 'Painjan'
Ed : M.N. Adwant
Sahitya Prasar Kendra, Nagpur

(3) 'Damayanti-Swayamvar'
By Raghunath Pandit

(4) 'Balakvinchi Kavita'
By Balkavi

(5) 'Vishakha'
By Kusumagraj

(6) 'Maridgandh'
By Vinda Karandikar

(7) 'Jahirnama'
By Narayan Surve

(8) 'Sandhyakalchya Kavita'
By Grace

(9) 'Ya Sattet Jeev Ramat Nahi'
By Namdev Dhasal

NEPALI

PAPER-I

(Answers must be written in Nepali)

Section A

1. History of the origin and development of Nepali as one of the new Indo Aryan Languages.

2. Fundamentals of Nepali Grammar and phonology :

(i) Nominal forms and categories :—

Gender, Number, Case, Adjectives, Pronouns, Avyayas

(ii) Verbal forms and categories :—

Tense, Aspects, Voice, Roots and Fixes

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(iii) Nepali Swara and Vyanjana;

3. Major Dialects of Nepali

4. Standardisation and Modernisation of Nepali with special reference to language movements (viz. Halanta Bahiskar, Jharrovad etc.)

5. Teaching of Nepali language in India—Its history and development with special reference to its socio-cultural aspects.

Section B

1. History of Nepali literature with special reference to its development in India.

2. Fundamental concepts and theories of Literature :

Kavya/Sahitya, Kavya Prayojan, Literary genres, Shabda Shakti, Rasa, Alankara, Tragedy, Comedy, Aesthetics, Stylistics.

3. Major literary trends and movements—

Swachchhandatavad, Yatharthavad, Astitwavad, Ayamik Movement Contemporary Nepali writings, Postmodernism.

4. Nepali folklores (the following folk-form only)—Sawai, Jhyaurey, Selo, Sangini, Lahari.

PAPER-II

(Answers must be written in Nepali)

This paper will require first hand reading of the texts prescribed below and questions will be designed to test the candidate's critical acumen.

Section A

1.	Santa Jnandil Das	Udaya Lahari
2.	Lekhnath Poudyal	Tarun Tapasi(Vishrams III, V, VI, XII, XV, XVIII only)
3.	Agam Sing Giri	Jaleko Pratibimba Royeko Pratidhwani (The following Poems only-Prasawako Chichyahatsanga Byunjheko Ek Raat, Chhorolai, Jaleko Pratibimba : Royeko Pratidhwani, Hamro Akashmani Pani Hunchha Ujyalo, Tihar).
4.	Haribhakta Katuwal	Yo Zinadagi Khai Ke Zindagi : (The following poems only-Jeevan : Ek Dristi, Yo Zindagi Khai Ke Zindagi, Akashka Tara Ke Tara, Hamilai Nirdho Nasamjha, Khai Manyata Yahan Atmahutiko Balidan Ko).
5.	Balkrishna Sama	Prahlad.
6.	Manbahadur Mukhia	Andhyaroma Banchneharu (The following One-Act only-Andhyaroma Banchneharu' 'Suskera')

Section B

1.	Indra Sundas	Sahara.
2.	Lilbahadur Chhetri	Brahmaputra ko Chheuchhau
3.	Rupnarayan Sinha	Katha Navaratna (The following stories only—Biteka Kura, Jimmewari Kasko, Dhanamatiko Cinema—Swapna, Vidhwasta Jeevan).
4.	Indrabahadur Rai	Vipana Katipaya (The following stories only—Raatbhari Huri Chalyo, Jayamaya Aphumatra Lekhapani Aipugi, Bhagi, Ghosh Babu,

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		Chhutuaiyo).
5.	Sanu Lama	**Katha Sampaad** (The following stories only—Swasni Manchhey, Khani Tarma Ekdin, Phurbale Gaun Chhadyo, Asinapo Manchhey).
6.	Laxmi Prasad	**Laxmi Nibandha** Devkota**Sangraha** (The following essays only—Sri Ganeshaya Namha, Nepali Sahityako Itihasma Sarvashrestha Purus, Kalpana, Kala Ra Jeevan, Gadha Buddhiman ki Guru?)
7.	Ramkrishna Sharma	**Das Gorkha** (The following essays only—Kavi, Samaj Ra Sahitya, Sahityama Sapekshata, Sahityik Ruchiko Praudhata, Nepali Sahityako Pragati).

ODIA

PAPER-I

(Answers must be written in Odia)

Section A

History of Odia Language

(i) Origin and development of Odia Language—Influence of Austric, Dravidian, Perso— Arabic and English on Odia Language.

(ii) Phonetics and Phonemics : Vowels, Consonants Principles of changes in Odia sounds.

(iii) Morphology : Morphemes (free, bound compound and complex), derivational and inflectional affixes, case inflection, conjugation of verb.

(iv) Syntax : Kinds of sentences and their trans-formation, structure of sentences.

(v) Semantics—Different types of change in meaning. Euphemism.

(vi) Common errors in spellings, grammatical uses and construction of sentences.

(vii) Regional variations in Odia Language (Western, Southern and Northern Odia) and Dialects (Bhatri and Desia).

Section B

History of Odia Literature

(i) Historical backgrounds (social, cultural and political) of Odia Literature of different periods.

(ii) Ancient epics, ornate kavyas and padavalis.

(iii) Typical structural forms of Odia Literature (Koili, Chautisa, Poi, Chaupadi, Champu).

(iv) Modern trends in poetry, drama short story, novel essay and literary criticism.

PAPER-II

(Answers must be written in Odia)

Critical Study of texts—

The paper will require first hand reading of the text and test the critical ability of the candidate.

Section A

Poetry

(Ancient)

1. Sāralā Dās—Shanti Parva from Mahābhārata.

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2. Jaganãth Dãs—Bhãgabata, XI Skadhã—Jadu Avadhuta Sambãda.

(Medieval)

3. Dinakrushna Dãs—Raskallola—(Chhãndas—16 & 34)
4. Upendra Bhanja—Lãvanyabati (Chhãndas—1 & 2).

(Modern)

5. Rãdhãnath Rãy—Chandrabhãgã.
6. Mãyãdhar Mãnasinha—Jeevan—Chitã.
7. Sãtchidananda Routray—Kabitã—1962.
8. Ramãkãnta Ratha—Saptama Ritu.

Section B

Drama :

9. Manoranjan Dãs—Kãtha-Ghoda.
10. Bijay Mishra—Tata Niranjanã.

Novel :

11. Fakir Mohan Senãpati—Chhamãna Ãthaguntha.
12. Gopinãth Mohãnty—Dãnãpani.

Short Story :

13. Surendra Mohãnty—Marãlara Mrityu.
14. Manoj Dãs—Laxmira Abhisãra.

Essay :

15. Chittaranjan Dãs—Tranga O Tadit (First Five essays).
16. Chandra Sekhar Rath — Mun Satyadharmã Kahuchhi (First five essays).

PUNJABI

PAPER-I

Answers must be written in Punjabi in Gurumukhi script

Section A

(a) Origin of Punjabi Language; different stages of development and recent development in Punjabi Language; characteristics of Punjabi phonology and the study of its tones; classification of vowels and consonants.

(b) Punjabi morphology; the number-gender system (animate and inanimate), prefixes, affixes and different categories of Post positions; Punjabi word formation; **Tatsam. Tad Bhav.** forms; Sentence structure, the notion of subject and object in Punjabi; Noun and verb phrases.

(c) Language and dialect : the notions of dialect and idiolect: major dialects of Punjabi : Pothohari, Majhi, Doabi, Malwai, Paudhi; the validity of speech variation on the basis of social stratification, the distinctive features of various dialects with special reference to tones Language and script; origin and development of Gurumukhi; Suitability of Gurumukhi for Punjabi.

(d) Classical background : Nath Jogi Sahit.

Medieval Literature : Gurmat, Suti, Kissa and Var : janamsakhis.

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Section B

(a)	Modern trends	Mystic, romantic, progressive and neomystic (Vir Singh, Puran Singh, Mohan Singh, Amrita Pritam, Bawa Balwant, Pritam Singh Safeer, J. S. Neki).
		Experimentalist (Jasbir Singh Ahluwalia, Ravinder Ravi, Ajaib Kamal).
		Aesthetes (Harbhajan Singh, Tara Singh). Neo-progressive (Pash, Jagtar, Patar).
(b)	Folk Literature	Folk songs, Folk tales, Riddles, Proverbs.
	Epic	(Vir Singh, Avtar Singh Azad, Mohan Singh).
	Lyric	(Gurus, Sufis and Modern Lyricists-Mohan Singh, Amrita Pritam, Shiv Kumar, Harbhajan Singh).
(c)	Drama	(I.C. Nanda, Harcharan Singh, Balwant Gargi, S.S. Sekhon, Charan Das Sidhu).
	Novel	(Vir Singh, Nanak Singh, Jaswant Singh Kanwal, K.S. Duggal, Sukhbir, Gurdial Singh, Dalip Kaur Tiwana, Swaran Chandan).
	Short Story	(Sujan Singh, K. S. Virk, Prem Parkash, Waryam Sandhu).
(d)	Socio-cultural	Sanskrit, Persian and Western.
	Literary influences;	
	Essay	(Puran Singh, Teja Singh, Gurbaksh Singh).
	Literary Criticism	(S.S. Sekhon, Attar Singh, Kishan Singh, Harbhajan Singh, Najam Hussain Sayyad).

PAPER-II

Answers must be written in Punjabi in Gurumukhi script

This paper will require first-hand reading of the texts prescribed and will be designed to test the candidate's critical ability.

Section A

(a)	Sheikh Farid	The complete Bani as includedin the Adi Granth.
(b)	Guru Nanak	Japu Ji. Baramah. Asa di Var.
(c)	Bulleh Shah	Kafian
(d)	Waris Shah	Heer

Section B

(a)	Shah Mohammad	Jangnama (Jang Singhante Firangian)
	Dhani Ram Chatrik	Chandan Vari
	(Poet)	Sufi Khana
		Nawan Jahan
(b)	Nanak Singh	Chitta Lahu
	(Novelist)	Pavittar Papi
		Ek Mian Do Talwaran

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(c)	Gurbaksh Singh Zindagi-di-Ras	
	(Essayist)	Nawan Shivala
		Merian Abhul Yadaan.
	Balraj Sahni	Mera Roosi Safarnama
	(Travelogue)	Mera Pakistani Safarnama
(d)	Balwant Gargi	Loha Kutt
	(Dramatist)	Dhuni-di-Agg
		Sultan Razia
	Sant Singh Sekhon	Sahityarth
	(Critic)	Parsidh Punjabi Kavi
		Punjabi Kav Shiromani.

SANSKRIT

PAPER-I

There will be three questions as indicated in the Question Paper which must be answered in Sanskrit. The Remaining questions must be answered either in Sanskrit or in the medium of examination opted by the candidate.

Section A

1. Significant features of the grammar, with particular stress on Sanjna, Sandhi, Karaka, Samasa, Kartari and Karmani vacyas (voice usages) (to be answered in Sanskrit).

2. (a) Main characteristics of Vedic Sanskrit language
   (b) Prominent feature of classical Sanskrit language
   (c) Contribution of Sanskrit to linguistic studies

3. General Knowledge of :—
   (a) Literary history of Sanskrit
   (b) Principal trends of literary criticism
   (c) Ramayana
   (d) Mahabharata
   (e) The origin and development of literary geners of :
   Mahakavya
   Rupaka (drama)
   Katha
   Akhyayika
   Campu
   Khandakavya
   Muktaka Kavya.

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Section B

4. Essential of Indian Culture with stress on :
   (a) Purusārthas
   (b) Samskāras
   (c) Varnāsramavyavasthā
   (d) Arts and fine arts
   (e) Technical Sciences.
5. Trends of Indian Philosophy
   (a) Mïmansā
   (b) Vedānta
   (c) Nyaya
   (d) Vaisesika
   (e) Sānkhya
   (f) Yoga
   (g) Bauddha
   (h) Jaina
   (i) Carvāka
6. Short Essay (in Sanskrit)
7. Unseen passage with the questions (to be answered in Sanskrit).

PAPER-II

Question from Group 4 is to be answered in Sanskrit only. Questions from Groups 1, 2 and 3 are to be answered either in Sanskrit or in the medium opted by the candidate.

Section A

General study of the following groups :—

Group 1
- (a) Raghuvamsam—Kalidasa
- (b) Kumarasambhavam—Kalidasa
- (c) Kiratarjuniyam—Bharavi
- (d) Sisupalavadham—Magha
- (e) Naisadhiyacaritam—Sriharsa
- (f) Kadambari—Banabhatta
- (g) Dasakumaracaritam—Dandin
- (h) Sivarajyodayam—S.B. Varnekar

Group 2
- (a) Isāvāsyopanisad
- (b) Bhagavadgitā
- (c) Sundarakanda of Valmiki's Ramayana
- (d) Arthasastra of Kautilya

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Group 3 (a)Svapanavasavadattam—Bhasa

(b) Abhijnanasakuntalam—Kalidasa

(c) Mricchakatikam—Sudraka

(d) Mudraraksasam—Visakhadatta

(e) Uttararamacaritam—Bhavbhuti

(f) Ratnavali—Sriharshavardhana

(g) Venisamharam—Bhattanarayana

Group 4 Short notes in Sanskrit on the following :—

(a) Meghadutam—Kalidasa

(b) Nitisatakam—Bhartrhari

(c) Pancatantra—

(d) Rajatarangini—Kalhana

(e) Harsacaritam—Banabhatta

(f) Amarukasatakam—Amaruka

(g) Gitagovindam—Jayadeva.

Section B

This section will require first hand reading of the following selected texts :— (Questions from Groups 1 & 2 are to be answered in Sanskrit only) Questions from Groups 3 and 4 are to be answered either in Sanskrit or in the Medium opted by the candidate.

Group 1 (a) Raghuvamsam—CantoI, Verses 1 to 10

(b) Kumarasambhavam—Canto I, Verses1 to 10

(c) Kiratarjuniyaue—Canto I, Verses 1 to 10

Group 2 (a)Isavasyopanisad—Verses—1, 2, 4, 6, 7, 15 and 18

(b) Bhagavatgita II Chapter Verses13 to 25

(c) Sundarakandam of Valmiki Canto15, Verses 15 to 30 (Geeta Press Edition)

Group 3 (a)Meghadutam—Verses 1 to 10

(b) Nitisatakam—Verses 1 to 10 (Edited by D.D. Kosambi Bharatiya Vidya Bhavan Publication)

(c) Kadambari—Sukanasopadesa (only)

Group 4 (a)Svapnavasavadattam Act VI

(b) Abhijnansakuntalam Act IV Verses 15 to 30 (M.R. Kale Edition)

(c) Uttararamacaritam Act I Verses 31 to 47 (M.R. Kale Edition).

SANTHALI

PAPER I

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(Answers must be written in Santhali)

Section A

Part I—History of Santhali Language

1. Main Austric Language family, population and distribution.
2. Grammatical structure of Santhali Language.
3. Important character of Santhali Language: Phonology, Morphology, Syntax, Semantics, Translation, Lexicography.
4. Impact of other languages of Santhali.
5. Standardization of Santhali Language.

Part II—History of Santhali Literature

1. Literary trend of the following four periods of history of Santhali Literature.
   (a) Ancient Literature before 1854.
   (b) Missionary period Literature between 1855 to 1889 AD.
   (c) Medieval period: Literature between 1890 to 1946 AD.
   (d) Modern period : Literature from 1947 AD to till date.
2. Writing tradition in History of Santhali literature.

Section-B

Literary forms—Main characteristics, history and development of following literary forms.

Part I

Folk Literature in Santhali—folk song, folk tale, phrase, idioms puzzles, and Kudum.

Part II

Modern literature in Santhali

1. Development of poetry and prominent poets.
2. Development of prose and prominent writers.
   (i) Novels and prominent Novelists.
   (ii) Stories and prominent story writers.
   (iii) Drama and Prominent Dramatist.
   (iv) Criticism and prominent critics.
   (v) Essay, sketches, memoirs, travelogues and prominent writers.

Santhali writers

Shyam Sundar Hembram, Pandit Raghunath Murmu, Barha Beshra, Sadhu Ramchand Murmu, Narayan Soren 'Toresutam', Sarda Prasad Kisku, Raghunath Tudu, Kalipada Soren, Sakla Soren, Digamber Hansda, Aditya Mitra 'Santhali', Babulal Murmu 'Adivasi', Jadumani Beshra, Arjun Hembram, Krishna Chandra Tudu, Rupchand Hansda, Kalendra Nath Mandi, Mahadev, Hansda, Gour Chandra Murmu, Thakur Prasad Murmu, Hara Prasad Murmu, Uday Nath Majhi, Parimal Hembram, Dhirendra Nath Baske, Shyam Charan Hembram, Damayanti Beshra, T.K. Rapaj, Boyha Biswanath Tudu.

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Part III

Cultural Heritage of Santhali tradition, customs, festival and rituals (birth, marriage and death).

PAPER II

(Answers must be written in Santhali)

Section A

This paper will require in-depth reading of the following texts and the questions will be designed to test the candidates' critical ability.

Ancient Literature :

Prose

(a) Kherwal Bonso Dhorom Puthi—Majhi Ramdas Tudu "Rasika".

(b) Mare Hapramko Reyak Katha—L.O. Scrafsrud.

(c) Jomsim Binti Lita—Mangal Chandra Turkulumang Soren.

(d) Marang Buru Binti—Kanailal Tudu.

Poetry

(a) Karam Sereng—Nunku Soren.

(b) Devi Dasain Sereng—Manindra Hansda.

(c) Horh Sereng—W.G. Archer.

(d) Baha Sereng—Balaram Tudu.

(e) Dong Sereng—Padmashri Bhagwat Murmu 'Thakur'.

(f) Hor Sereng—Raghunath Murmu.

(g) Soros Sereng—Babulal Murmu "Adivasi".

(h) More Sin More Ndia—Rup Chand Hansda.

(i) Judasi Madwa Latar—Tez Narayan Murmu.

Section B

Modern Literature

Part I—Poetry

(a) Onorhen Baha Dhalwak—Paul Jujhar Soren.

(b) Asar Binti—Narayan Soren "Tore Sutam".

(c) Chand Mala—Gora Chand Tudu.

(d) Onto Baha Mala—Aditya Mitra "Santhali".

(e) Tiryo Tetang—Hari Har Hansda.

(f) Sisirjon Rar—Thakur Prasad Murmu.

Part II—Novels

(a) Harmawak Ato—R.Karstiars (Translator—R.K. Kisku Rapaz).

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(b) Manu Mati—Chandra Mohan Hansda.

(c) Ato Orak—Doman Hansdak.

(d) Ojoy Gada Dhiph re—Nathenial Murmu.

Part III—Stories

(a) Jiyon Gada—Rup Chand Hansda and Jadumani Beshra.

(b) Mayajaal—Doman Sahu 'Samir' and Padmashri Bhagwat Murmu 'Thakur'.

Part IV—Drama

(a) Kherwar Bir—Pandit Raghunath Murmu.

(b) Juri Khatir—Dr. K.C. Tudu.

(c) Birsa Bir—Ravi Lal Tudu.

Part V—Biography

Santal Ko Ren Mayam Gohako—Dr. Biswanath Hansda.

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SINDHI

PAPER I

Answers must be written in Sindhi
(Arabic or Devanagari Script)

Section A

1. (a) Origin and evolution of Sindhi language—views of different scholars.

(b) Significant linguistic features of Sindhi language, including those pertaining to its phonology, morphology and syntax.

(c) Major dialects of the Sindhi language.

(d) Sindhi vocabulary—stages of its growth, including those in the pre-partition and post-partition periods.

(e) Historical study of various Writing Systems (Scripts) of Sindhi.

(f) Changesin the structure of Sindhi language in India, after partition, due to influence of other languages and social conditions.

Section B

2. Sindhi literature through the ages in context of socio-cultural conditions in the respective periods :

(a) Early medieval literature upto 1350 A.D. including folk literature.

(b) Late medieval period from 1350 A.D. to 1850 A.D.

(c) Renaissance period from 1850 A.D. to 1947 A.D.

(d) Modern period from 1947 and onwards.

(Literary genres in Modern Sindhi literature andexperiments in poetry, drama, novel, short story, essay, literary criticism, biography, autobiography, memoirs and travelogues.)

PAPER II

Answer must be written in Sindhi
(Arabic or Devanagari script)

This paper will require the first-hand reading of the texts prescribed and will be designed to test the candidate's critical ability.

Section A

References to context and critical appreciation of the texts included in this section.

(1) Poetry

a. "Shah Jo Choond Shair" : ed. H.I. Sadarangani, Published by Sahitya Akademi (First 100 pages).

b. "Sachal Jo Choond Kalam" : ed. Kalyan B. Advani Published by Sahitya Akademi (Kafis only).

c. "Sami-a-ja Choond Sloka" : ed. B.H. Nagrani Published by Sahitya Akademi (First 100 pages).

d. "Shair-e-Bewas" : by Kishinchand Bewas("Saamoondi Sipoon" portion only).

e. "Roshan Chhanvro" : Narayan Shyam.

f. "Virhange Khapoi je Sindhi Shair jee Choond" : ed. H.I. Sadarangani, published by Sahitya Akademi.

(2)Drama

g. "Behtareen Sindhi Natak" (One-act Plays) : Edited by M. Kamal Published by Gujarat Sindhi

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Academy.

h. "Kako Kaloomal" (Full-length Play) : by Madan Jumani.

Section B

References to context and critical appreciation of the texts included in this section.

a. 'Pakheeara Valar Khan Vichhrya' (Novel) : by Gobind Malhi.

b. 'Sat Deenhan' (Novel) : by Krishin Khatwani.

c. 'Choond Sindhi Kahanyoon' (Short Stories) Vol. III. : Edited by Prem Prakash, published by Sahitya Akademi.

d. 'Bandhan' (Short Stories) : Sundari Uttamchandani.

e. 'Behtareen Sindhi Mazmoon' (Essays): Edited by Hiro Thakur, published by Gujarat Sindhi Academi.

f. 'Sindhi Tanqeed' (Criticism) : Edited by Harish Vaswani : Published by Sahitya Akademi.

g. 'Mumhinjee Hayati-a-ja Sona Ropa varqa' (Autobiography) : by Popati Hiranandani.

h. "Dr. Choithram Gidwani" (Biography) : by Vishnu Sharma.

TAMIL

PAPER I

Answers must be written in Tamil

Section A

Part 1: History of Tamil Language

Major Indian Language Families—The place of Tamil among Indian Languages in general and Dravidian in particular—Enumeration and Distribution of Dravidian languages.

The language of Sangam Literature—The language of medieval Tamil : Pallava Period only—Historical study of Nouns, Verbs, Adjectives, Adverbs—Tense markers and case markers in Tamil.

Borrowing of words from other languages into Tamil—Regional and social dialects—difference between literary and spoken Tamil.

Part 2 : History of Tamil Literature

Tolkappiyam-Sangam Literature—The division of Akam and Puram—The secular characteristics of Sangam Literature—The development of Ethical literature—Silappadikaram and Manimekalai.

Part 3 : Devotional Literature (Alwars and Nayanamars)

The bridal mysticism in Alwar hymns—Minor literary forms (Tutu, Ula, Parani, Kuravanji).

Social factors for the development of Modern Tamil Literature; Novel, Short Story and New Poetry—The impact of various political ideologies on modern writings.

Section B

Part 1 : Recent trends in Tamil Studies

Approaches to criticism : Social, psychological, historical and moralistic—the use of criticism—the various techniques in literature; Ullurai, Iraicchi, Thonmam (Myth) Otturuvagam (allegory), Angadam (Satire), Meyappadu, Padimam (image), Kuriyeedu (Symbol), Irunmai (Ambiguity)—The concept of comparative literature-the principle of comparative literature.

Part 2 : Folk literature in Tamil

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Ballads, Songs, proverbs and riddles—Sociological study of Tamil folklore. Uses of translation—Translation of Tamil works into other languages-Development of journalism in Tamil.

Part 3 : Cultural Heritage of the Tamils

Concept of Love and War—Concept of Aram-the ethical codes adopted by the ancient Tamils in their warfare-customs beliefs, rituals, modes of worship in the five Thinais.

The Cultural changes as revealed in post sangam literature—cultural fusion in the medieval period (Janism and Buddhism). The development of arts and architecture through the ages (Pallavas, later Cholas, and Nayaks). The impact of various political, social, religious and cultural movements on Tamil Society. The role of mass media in the cultural change of contemporary Tamil society.

PAPER II

Answers must be written in Tamil

The paper will require first-hand reading of the text prescribed and will be designed to test the critical ability of the candidate.

Section A

Part 1 : Ancient Literature

(1) Kuruntokai (1—25 poems)

(2) Purananuru (182—200 poems)

(3) TirukkuralPorutpal :ArasiyalumAmaichiyalum(from Iraimatchi to Avaianjamai).

Part 2 : Epic Literature

(1) Silappadikaram : Madhurai Kandam only.

(2) Kambaramayanam : Kumbakarunan Vadhai Padalam.

Part 3 : Devotional Literature

(1) Tiruvasagam : Neetthal Vinnappam

(2) Tiruppavai : (Full Text).

Section B

Modern Literature

Part 1 : Poetry

(1) Bharathiar : Kannan Pattu

(2) Bharathidasan : Kudumba Vilakku

(3) Naa. Kamarasan : Karappu Malarkal

Prose

(1) Mu. Varadharajanar : Aramum Arasiyalum

(2) C. N. Annadurai : Ye! Thazhntha Tamilagame.

Part 2 : Novel, Short Story and Drama

(1) Akilon ; Chittairappavai

(2) Jayakanthan : Gurupeedam

(3) Cho : Yaurkkum Vetkamillai

Part 3 : Folk Literature

(1) Muthuppattan kathai Edited by Na. Vanamamalai, (Publication : Madurai Kamaraj University).

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(2) Malaiyaruvi, Edited by Ki. Va Jagannathan (Publication : Saraswathi Mahal, Thanjavur).

TELUGU

PAPER I

Answer must be written in Telugu

Section A : Language

1. Place of Telugu among Dravidian languages and its antiquity—Etymological History of Telugu,Tenugu and Andhra.

2. Major linguistic changes in phonological, morphological, grammatical and syntactical levels, from Proto-Dravidian to old Telugu and from old Telugu to Modern Telugu.

3. Evolution of spoken Telugu when compared to classical Telugu-Formal and functional view of Telugu language.

4. Influence of other languages and its impact on Telugu.

5. Modernization of Telugu language :

(a) Linguistic and literary movements and their role in modernization of Telugu.

(b) Role of media in modernization of Telugu (News-papers, Radio, TV etc.)

(c) Problems of terminology and mechanisms in coining new terms in Telugu in various discourses including scientific and technical.

6. Dialects of Telugu—Regional and social variations and problems of Standardization.

7. Syntax—Major divisions of Telugu sentences—simple, complex and compound sentences—Noun and verb predications—Processes of nominalization and relativization—Direct and indirect reporting-conversion processes.

8. Translation—Problems of translation, cultural, social and idiomatic—Methods of translation—Approaches to translation—Literary and other kinds of translation—Various uses of translation.

Section B : Literature

1. Literature in Pre-Nannaya Period—Marga and Desi poetry.

2. Nannaya Period—Historical and literary background of Andhra Mahabharata.

3. Saiva poets and their contribution—Dwipada, Sataka, Ragada, Udaharana.

4. Tikkana and his place in Telugu literature.

5. Errana and his literary works—Nachana Somana and his new approach to poetry.

6. Srinatha and Potana—Their works and contribution.

7. Bhakti poets in Telugu literature—Tallapaka Annamayya, ramadasu, tyagayya.

8. Evolution of prabandhas—Kavya and prabandha.

9. Southern school of Telugu literature-raghunatha Nayaka, chemakura vankatakavi and women poets-Literary forms like yakshagana, prose and padakavita.

10. Modern Telugu Literature and literary forms—Novel, Short Story, Drama, Playlet and poetic forms.

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11. Literary Movements : Reformation, Nationalism, Neo-classisicism, Romanticism and Progressive, Revolutionary movements.

12. Digambarakavulu, feminist and dalit Literature.

13. Main divisions of folk literature—Performing folk arts.

PAPER II

Answer must be written in Telugu

This paper will require first hand reading of the prescribed texts and will be designed to test the candidate's critical ability, which will be in relation to the following approaches :—

(i) Aesthetic approach—Rassa, Dhawani, Vakroti and Auchitya—Formal and Structural-Imagery and Symbolism.

(ii) Sociological, Historical, Ideological, Psychological approaches.

Section A

1. Nannaya-Dushyanta Chritra (Adiparva 4th Canto verses 5—109).
2. Tikkana-Sri Krishna Rayabaramu (Udyoga parva-3rd Canto verses 1—144).
3. Srinath-Guna Nidhi Katha (Kasikhandam, 4th Canto, verses 76—133).
4. Pingali Surana-sugatri Salinulakatha (Kalapurno-dayamu 4 Canto verses, 60—142).
5. Molla-Ramayanamu (Balakanda including avatarika).
6. Kasula Purushothama Kavi—Andhra Nayaka Satakamu.

Section B

7. Gurajada Appa Rao—Animutyalu (Short stories).
8. Viswanatha Satyanarayana—Andhra prasasti.
9. Devulapalli Krishna Sastry—Krishnapaksham (excluding Uravsi and Pravasam).
10. Sri Sri-Maha prastanam.
11. Jashuva-Gabbilam (Part I).
12. C. Narayana Reddy—Karpuravasanta rayalu.
13. Kanuparti Varalakshmamma—Sarada lekhalu (Part I).
14. Atreya—N.G.O.
15. Racha Konda Viswanatha Sastry—Alpajaeevi.

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URDU

PAPER I

Answer must be written in Urdu

Section A

Development of Urdu Language

(a) Development of Indo-Aryan

(i) Old Indo-Aryan

(ii) Middle Indo-Aryan

(iii) New Indo-Aryan.

(b) Western Hindi and its dialects Brij Bhasha Khadi Boli, Haryanavi, Kannauji, Bundeli—Theories about the origin of Urdu language.

(c) Dakhani Urdu—origin and development, its significant linguistic features.

(d) Social and Cultural roots of Urdu language— and its distinctive features.

Script, Phonology, Morphology, Vocabulary.

Section B

(a) Genres and their development :

(i) Poetry: Ghazal, Masnavi, Qasida, Marsia, Rubai Jadid Nazm.

(ii) Prose : Novel, Short Story, Dastan, Drama, Inshaiya, Khutoot, Biography.

(b) Significant feaures of : (i) Deccani, Delhi and Lucknow schools, (ii) Sir Syed movement, Romantic movement, Progressive movement, Modernism.

(c) Literary Criticism and its development with reference to Hali, Shibli, Kaleemuddin Ahmad, Ehtisham Hussain, Ale-Ahmad Suroor.

(d) Essay writing (covering literary and imaginativetopics).

PAPER II

Answer must be written in Urdu

This paper will require first hand reading of the texts prescribed and will be designed to test the candidate's critical ability.

Section A

1.	Mir Amman	Bagho-Babar
2.	Ghalib	Intikhab-e-Khutoot-e Ghalib
3.	Mohd. Husain Azad	Nairang-e-Khayal
4.	Prem Chand	Godan
5.	Rajendra Singh Bedi	Apne Dukh Mujhe Dedo
6.	Abul Kalam Azad	Ghubar-e-Khatir

Section B

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1.	Mir	Intikhab-e-Kalam-e-Mir (Ed. Abdul Haq.)
2.	Mir Hasan	Sahrul Bayan
3.	Ghalib	Diwan-e-Ghalib
4.	Iqbal	Bal-e-Jibrail
5.	Firaq	Gul-e-Naghma
6.	Faiz	Dast-e-Saba
7.	Akhtruliman	Bint-e-Lamhat

MANAGEMENT

The candidate should make a study of the concept of development of Management as science and art drawing upon the contributions of leading thinkers of management and apply the concepts to the real life of government and business decision-making keeping in view the changes in the strategic and operative environment.

PAPER I

1. Managerial Function and Process :

Concept and foundations of management, Evolution of Management Thoughts; Managerial Functions—Planning, Organizing, Controlling; Decision-making; Role of Manager, Managerial skills; Entrepreneurship; Management of innovation; Managing in a global environment, Flexible Systems Management; Social responsibility and managerial ethics; Process and customer orientation; Managerial processes on direct and indirect value chain.

2. Organisational Behaviour and Design :

Conceptual model of organization behaviour; The individual processes—personality, values and attitude, perception, motivation, learning and reinforcement, work stress and stress management; The dynamics of Organization behaviour—power and politics, conflict and negotiation, leadership process and styles, communication; The Organizational Processes—decision-making, job design; Classical, Neoclassical and Contingency approaches to organizational design; Organizational theory and design—Organizational culture, managing cultural diversity, learning Organization; Organizational change and development; Knowledge Based Enterprise—systems and processes; Networked and virtual organizations.

3. Human Resource Management :

HR challenges; HRM functions; The future challenges of HRM; Strategic Management of human resources; Human resource planning; Job analysis; Job evaluation, Recruitment and selection; Training and development; Promotion and transfer; Performance management; Compensation management and bnenefits; Employee morale and productivity; Management of Organizational climate and Industrial relations; Human resources accounting and audit; Human resource information system; International human resource management.

4. Accounting for Managers :

Financial accounting—concept, importance and scope, generally accepted accounting principles, preparation of financial statements with special reference to analysis of a balance sheet and measurment of business income, inventory valuation and depreciation, financial statement analysis, fund flow analysis, the statement of cash flows; Management accounting concept, need, imporance and scope; Cost accounting—

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records and processes, cost ledger and control accounts, reconciliation and integration bwtween financial and cost accounts; Overhead cost and control, Job and process costing, Budget and budgetary control, Performance budgeting, Zero-base budgeting, relevant costing and costing for decision-making, standard costing and variance analysis, marginal costing and absorption costing.

5. Financial Management :

Goal of Finance Function. Concepts of value and return. Valuation of bonds and Shares; Management of working capital : Estimation and Financing; Management of cash, receivables, inventory and current liabilities; Cost of capital ; Capital budgeting; Financial and operating leverage; Design of capital structure: theories and practices; Shareholder value creation: dividend policy, corporate financial policy and strategy, management of corporate distress and restructuring strategy; Capital and money markets: institutions and instruments; Leasing hire purchase and venture capital; Regulation of capital market; Risk and return: portfolio theory; CAPM; APT; Financial derivatives: option, futures, swap; Recent reforms in financial sector.

6. Marketing Management :

Concept, evolution and scope; Marketing strategy formulation and components of marketing plan; Segmenting and targeting the market; Positioning and differentiating the market offering; Analyzing competition; Analyzing consumer markets; Industrial buyer behaviour; Market research; Product strategy; Pricing strategies; Designing and managing Marketing channels; Integrated marketing communications; Building customer staisfaction, Value and retention; Services and non-profit marketing; Ethics in marketing; Consumer protection; Internet marketing; Retail management; Customer relationship management; Concept of holistic marketing.

PAPER-II

1. Quantitative Techniques in Decision-making :

Descriptive statistics—tabular, graphical and numerical methods, introduction to probability, discrete and continuous probability distributions, inferential statistics-sampling distributions, central limit theorem, hypothesis testing for differences between means and proportions, inference about population variances, Chisquare and ANOVA, simple correlation and regression, time series and forecasting, decision theory, index numbers; Linear programming—problem formulation, simplex method and graphical solution, sensitivity analysis.

2. Production and Operations Management :

Fundamentals of operations management; Organizing for production; Aggregate production planning, capacity planning, plant design: process planning, plant size and scale of operations, Management of facilities; Line balancing; Equipment replacement and maintenance; Production control; Supply, chain management—vendor evaluation and audit; Quality management; Statistical process control, Six Sigma; Flexibility and agility in manufacturing systems; World class manufaturing; Project management concepts, R&D management, Management of service operations; Role and importance of materials management, value analysis, make or buy decision; Inventory control, MRP; Waste management.

3. Management Information System :

Conceptual foundations of information systems; Information theory; Information resource management; Types of information Systems; Systems Development—Overview of Systems and Design; System Development management life-cycle, Designing online and distributed environments; Implementation and control of project; Trends in information technology; Managing data resources—Organising data. DSS and RDBMS; Enterprise Resource Planning (ERP), Expert systems, e-Business architecture, e-Governance; Information systems planning, Flexibility in information systems; User involvement; Evaluation of

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information systems.

4. Government Business Interface :

State participation in business, Interaction between Government, Business and different Chambers of Commerce and Industry in India; Government's ploicy with regard to Small Scale Industries; Government clearances for establishing a new enterprise; Public Distribution System; Government control over price and distribution; Consumer Protection Act (CPA) and The Role of Voluntary Organizations in protecting consumers' rights; New Industrial Policy of the Government : liberalization, deregulation and privatisation; Indian planning system; Government policy concerning development of Backward areas/regions; The Responsibilities of the business as well as the Government to protect the environment; Corporate Governance; Cyber Laws.

5. Strategic Cost Management :

Business policy as a field of study; Nature and scope of strategic management, Strategic intent, vision, objectives and policies; Process of strategic planning and implementa-tion; Environmental analysis and internal analysis; SWOT analysis; Tools and techniques for strategic analysis—Impact matrix: The experience curve, BCG matrix, GEC mode, Industry analysis, Concept of value chain; Strategic profile of a firm; Framework for analysing competition; Competitive advantage of a firm; Generic competitive strategies; Growth strategies—expansion, integration and diversification; Concept of core competence, Strategic flexibility; Reinventing strategy; Strategy and structure; chief Executive and Board; turnaround management; Management of strategic change; Strategic alliances, Mergers and Acquisitions; Strategy and corporate evolution in the Indian context.

6. International Business :

International Business Environment : Changing composition of trade in goods and services; India's Foreign Trade: Policy and trends; Financing of International trade; Regional Economic Cooperation; FTAs; Internationalisation of service firms; International production; Operation Management in International companies; International Taxation; Global competitiveness and technological developments; Global E-Business; Designing global organisational structure and control; Multicultural management; Global business strategy; Global marketing strategies; Export Management; Export-Import procedures; Joint Ventures; Foreign Investment: Foreign direct investment and foreign portfolio investment; Cross-border Mergers and Acquisitions; Foreign Exchange Risk Exposure Management; World Financial Markets and International Banking; External Debt Management; Country Risk Analysis.

MATHEMATICS

PAPER I

(1) Linear Algebra :

Vector spaces over R and C, linear dependence and independence, subspaces, bases, dimensions, Linear transformations, rank and nullity, matrix of a linear transformation.

Algebra of Matrices; Row and column reduction, Echelon form, congruence's and similarity; Rankof a matrix; Inverse of a matrix; Solution of system of linear equations; Eigenvalues and eigenvectors, characteristic polynomial, Cayley-Hamilton theorem, Symmetric, skew-symmetric, Hermitian, skew-Hermitian, orthogonal and unitary matrices and their eigenvalues.

(2) Calculus :

Real numbers, functions of a real variable, limits, continuity, differentiability, mean-value theorem, Taylor's

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theorem with remainders, indeterminate forms, maxima and minima, asymptotes; Curve tracing; Functions of two or three variables; Limits, continuity, partial derivatives, maxima and minima, Lagrange's method of multipliers, Jacobian.

Riemann's definition of definite integrals; Indefinite integrals; Infinite and improper integral; Double and triple integrals (evaluation techniques only); Areas, surface and volumes.

(3) Analytic Geometry :

Cartesian and polar coordinates in three dimensions, second degree equations in three variables, reduction to Canonical forms; straight lines, shortest distance between two skew lines, Plane, sphere, cone, cylinder, paraboloid, ellipsoid, hyperboloid of one and two sheets and their properties.

(4) Ordinary Differential Equations :

Formulation of differential equations; Equations of first order and first degree, integrating factor; Orthogonal trajectory; Equations of first order but not of first degree, Clairaut's equation, singular solution.

Second and higher order liner equations with constant coefficients, complementary function, particular integral and general solution.

Section order linear equations with variable coefficients, Euler-Cauchy equation; Determination of complete solution when one solution is known using method of variation of parameters.

Laplace and Inverse Laplace transforms and their properties, Laplace transforms of elementary functions. Application to initial value problems for 2nd order linear equations with constant coefficients.

(5) Dynamics and Statics :

Rectilinear motion, simple harmonic motion, motion in a plane, projectiles; Constrained motion; Work and energy, conservation of energy; Kepler's laws, orbits under central forces.

Equilibrium of a system of particles; Work and potential energy, friction, Common catenary; Principle of virtual work; Stability of equilibrium, equilibrium of forces in three dimensions.

(6) Vector Analysis :

Scalar and vector fields, differentiation of vector field of a scalar variable; Gradient, divergence and curl in cartesian and cylindrical coordinates; Higher order derivatives; Vector identities and vector equation.

Application to geometry : Curves in space, curvature and torsion; Serret-Furenet's formulae.

Gauss and Stokes' theorems, Green's indentities.

PAPER II

(1) Algebra :

Groups, subgroups, cyclic groups, cosets, Lagrange's Theorem, normal subgroups, quotient groups, homomorphism of groups, basic isomorphism theorems, permutation groups, Cayley's theorem.

Rings, subrings and ideals, homomorphisms of rings; Integral domains, principal ideal domains, Euclidean domains and unique factorization domains; Fields, quotient fields.

(2) Real Analysis :

Real number system as an ordered field with least upper bound property; Sequences, limit of a sequence, Cauchy sequence, completeness of real line; Series and its convergence, absolute and conditional convergence of series of real and complex terms, rearrangement of series. Continuity and uniform continuity of functions, properties of continuous functions on compact sets.

Riemann integral, improper integrals; Fundamental theorems of integral calculus.

Uniform convergence, continuity, differentiability and integrability for sequences and series of functions; Partial derivatives of functions of several (two or three) variables, maxima and minima.

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(3) Complex Analysis :

Analytic function, Cauchy-Riemann equations, Cauchy's theorem, Cauchy's integral formula, power series, representation of an analytic function, Taylor's series; Singularities; Laurent's series; Cauchy's residue theorem; Contour integration.

(4) Linear Programming :

Linear programming problems, basic solution, basic feasible solution and optimal solution; Graphical method and simplex method of solutions; Duality.

Transportation and assignment problems.

(5) Partial Differential Equations :

Family of surfaces in three dimensions and formulation of partial differential equations; Solution of quasilinear partial differential equations of the first order, Cauchy's method of characteristics; Linear partial differential equations of the second order with constant coefficients, canonical form; Equation of a vibrating string, heatequation, Laplace equation and their solutions.

(6) Numerical Analysis and Computer Programming :

Numerical methods: Solution of algebraic and transcendental equations of one variable by bisection, Regula-Falsi and Newton-Raphson methods, solution of system of linear equations by Gaussian Elimination and Gauss-Jorden (direct), Gauss-Seidel (iterative) methods. Newton's (forward and backward) and interpolation, Lagrange's interpolation.

Numerical integration: Trapezoidal rule, Simpson's rule, Gaussian quadrature formula.

Numerical solution of ordinary differential equations : Eular and Runga Kutta methods.

Computer Programming : Binary system; Arithmetic and logical operations on numbers; Octal and Hexadecimal Systems; Conversion to and from decimal Systems; Algebra of binary numbers.

Elements of computer systems and concept of memory; Basic logic gates and truth tables, Boolean algebra, normal forms.

Representation of unsigned integers, signed integers and reals, double precision reals and long integers.

Algorithms and flow charts for solving numerical analysis problems.

(7) Mechanics and Fluid Dynamics :

Generalised coordinates; D'Alembert's principle and Lagrange's equations; Hamilton equations; Moment of inertia; Motion of rigid bodies in two dimensions.

Equation of continuity; Euler's equation of motion for inviscid flow; Stream-lines, path of a particle; Potential flow; Two-dimensional and axisymmetric motion; Sources and sinks, vortex motion; Navier-Stokes equation for a viscous fluid.

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MECHANICAL ENGINEERING

PAPER I

1. Mechanics :

1.1 Mechanics of Rigid Bodies :

Equations of equilibrium in space and its application; first and second moments of area; simple problems on friction; kinematics of particles for plane motion; elementary particle dynamics.

1.2 Mechanics of Deformable Bodies :

Generalized Hooke's law and its application; design problems on axial stress, shear stress and bearing stress; material properties for dynamic loading; bending shear and stresses in beams; determination of principle stresses and strains-analytical and graphical; compound and combined stresses; bi-axial stresses-thin walled pressure vessel; material behaviour and design factors for dynamic load; design of circular shafts for bending and torsional load only; deflection of beam for statically determinate problems; theories of failure.

2.Engineering Materials :

Basic concepts on structure of solids, common ferrous and non-ferrous materials and their applications; heat-treatment of steels; non-metalsplastics, cermics, composite materials and nano-materials.

3.Theory of Machines :

Kinematic and dynamic analysis of plane mechanisms. Cams, Gears and empicyclie gear trains, flywheels, governors, balancing of rigid rotors, balancing of single and multicy- linder engines, linear vibration analysis of mechanical systems (single degree of freedom), Critical speeds and whirling of shafts.

4. Manufacturing Science :

4.1 Manufacturing Process:

Machine tool engineering - Merhant's force analysis: Taylor's tool life equation; conventional machining; NC and CNC machining process; jigs and fixtures.

Non-conventional machining-EDM, ECM, ultrasonic, water jet machining etc.; application of lasers and plasmas; energy rate calculations.

Forming and welding processes-standard processes.

Metrology-concept of fits and tolerances; tools and guages; comparators; inspection of length; position; profile and surface finish.

4.2 Manufacturing Management :

System design: factory location—simple OR models; plant layout-methods based; applications of engineering economic analysis and break-even analysis for product selection, process selection and capacity planning; predetermined time standards.

System planning; forecasting methods based on regression and decomposition, design and blancing of multi model and stochastic assembly lines; inventory management-probablistic inventory models for order time and order quanitity determination; JIT systems; strategic sourcing; managing inter plant logistics.

System operations and control: Scheduling algorithms for job shops; applications of statistical methods for product and process quality control applications of control charts for mean, range, percent defective, number of defectives and defects per unit; quality cost systems; management of resources, organizations and risks in projects.

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System improvement: Implementation of systems, such as total quality management, developing and managing flexible, lean and agile Organizations.

PAPER II

1. Thermodynamics, Gas Dynamics Turbine :

1.1 Basic concept of First-law and Second law of Thermodynamics; concept of entropy and reversibility; availability and unavailability and irreversibility.

1.2 Classification and properties of fluids; incompressible and compressible fluids flows; effect of Mach number and compressibility; continuity momentum and energy equations; normal and oblique shocks; one dimensional isentropic flow; flow or fluids in duct with frictions that transfer.

1.3 Flow through fans, blowers and compressors; axial and centrifugal flow configuration; design of fans and compressors; single problems compresses and turbine cascade; open and closed cycle gas turbines; work done in the gas turbine; reheat and regenerators.

2. Heat Transfer :

2.1 Conduction heat transfer—general conduction equation-Laplace, Poisson and Fourier equations; Fourier law of conduction; one dimensional steady state heat conduction applied to simple wall, solid and hollow cylinder and spheres.

2.2 Convection heat transfer—Newton's law of convection; free and forces convection; heat transfer during laminar and turbulent flow of an incompressible fluid over a flat plate; concepts of Nusselt number, hydrodynamic and thermal boundary layer their thickness; Prandtl number; analogy between heat and momentum transfer—Reynolds, Colbum, Prandtl analogies; heat transfer during laminar and turbulent flow through horizontal tubes; free convection from horizontal and vertical plates.

2.3 Black body radiation—basic radiation laws such as Stefan-boltzman, Planck distribution, Wein's displacement etc.

2.4 Basic heat exchanger analysis; classification of heat exchangers.

3. Engines :

3.1 Classification, themodynamic cycles of operation; determination of break power, indicated power, mechanical efficiency, heat balance sheet, interpretation of performance characteristics, petrol, gas and diesel engines.

3.2 Combustion in SI and CI engines, normal and abnormal combustion; effect of working parameters on knocking, reduction of knocking; Forms of combustion chamber for SI and CI engines; rating of fuels; additives; emission.

3.3 Different systems of IC engines-fuels; lubricating; cooling and transmission systems. Alternate fuels in IC engines.

4. Steam Engineering :

4.1 Steam generation—modified Ranking cycle analysis; Modern steam boilers; steam at critical and supercritical pressures; draught equipment; natural and artificial draught; boiler fuels solid, liquid and gaseous fuels. Steam turbines—Principle; types; compounding; impulse and reaction turbines; axial thrust.

4.2 Steam nozzles—flow of steam in convergent and divergent nozzle pressure at throat for maximum discharge with different initial steam conditions such as wet, saturated and superheated, effect of variation of back pressure; supersaturated flow of steam in nozzles, Wilson line.

4.3 Rankine cycle with internal and external irreversibility; reheat factor; reheating and regeneration,

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methods of governing; back pressure and pass out turbines.

4.4 Steam power plants—combined cycle power generation; heat recovery steam generators (HRSG) fired and unfired, co-generation plants.

5. Refrigeration and Air-conditioning :

5.1 Vapour compression refrigeration cycle—cycle on p-H & T-s diagrams; ecofriendly refrigerants—R 134a. 123; Systems like evaporators, condensers, compressor, expansion devices. Simple vapour absorption systems.

5.2 Psychrometry—properties; processes; charts; sensible heating and cooling; humidification and dehumidification effective temperature; air-conditioning load calculation; simple duct design.

MEDICAL SCIENCE

PAPER I

1. Human Anatomy :

Applied anatomy including blood and nerve supply of upper and lower limbs and joints of shoulder, hip and knee.

Gross anatomy, blood supply and lymphatic drainage of tongue, thyroid, mammary gland, stomach, liver, prostate, gonads and uterus.

Applied anatomy of diaphragm, perineum and inguinal region.

Clinical anatomy of kidney, urinary bladder, uterine tubes, vas deferens.

Embryology : Placenta and placental barrier. Development of heart, gut, kidney. uterus, ovary, testis and their common congenital abnormalities.

Central and Peripheral Autonomic Nervous System : Gross and clinical anatomy of ventricles of brain, circulation of cerebrospinal fluid; Neural pathways and lesions of cutaneous sensations, hearing and vision; Cranial nerves distribution and clinical significance; Components of autonomic nervous system.

2. Human Physiology :

Conduction and transmission of impulse, mechanism of contraction, neuromuscular transmission, reflexes, control of equilibrium, posture and muscle tone, descending pathways, functions of cerebellum, basal ganglia, Physiology of sleep and consciousness.

Endocrine System : Mechanism of action of hormones; formation, secretion, transport, metabolism, function and regulation of secretion of pancreas and pituitary gland.

Physiology of Reproductive System : Pregnancy menstrual cycle, lactation, pregnancy.

Blood : Development, regulation and fate of blood cells.

Cardio-vascular,cardiac output, blood pressure, regulation of cardiovascular functions.

3. Biochemistry :

Organ function tests—liver, kidney, thyroid Protein synthesis.

Vitamins and minerals.

Restriction fragment length.

polymorphism (RFLP).

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Polymerase chain reaction (PCR).

Radio-immunoassays (RIA).

4. Pathology :

Inflammation and repair, disturbances of growth and cancer, Pathogenesis and histopathology of rheumatic and ischaemic heart disease and diabetes mellitus. Differentiation between benign, malignant, primary and metastatic malignancies, Pathogenesis and histopathology of bronchogenic carcinoma, carcinoma breast, oral cancer, cancer cervix, leukemia, Etiology, pathogenesis and histopathology of—cirrhosis liver, glomerulonephritis, tuberculosis, acute osteomyelitis.

5. Microbiology :

Humoral and cell mediated immunity.

Diseases caused by and laboratory diagnosis of —

* Meningococcus, Saimonella
* Shigella, Herpes, Dengue, Polio
* HIV/AIDS, Malaria, E. Histolytica, Giardia
* Candida, Cryptococcus, Aspergillus.

6. Pharmacology :

Mechanism of action and side effects of the following drugs :

* Antipyretics and analgesics, Antibiotics,
* Antimalaria, Antikala-azar, Antidiabetics,
* Antihypertensive, Antidiuretics, General and cardiac vasodilators, Antiviral, Antiparasitic, Antifungal, Immunosuppressants,
* Anticancer.

7. Forensic Medicine and Toxicology

Forensic examination of injuries and wounds; Examination of blood and seminal stains; Poisoning, sedative overdose, hanging, drowning, burns, DNA and finger print study.

PAPER-II

1. General Medicine

Etiology, clinical features, diagnosis and principles of management (including prevention) of—Typhoid, Rabies, AIDS, Dengue, Kala-azar, Japanese Encephalitis.

Etiology, clinical features, diagnosis and principles of management of :

Ischaemic heart disease, pulmonary embolism.

Bronchial asthma.

Pleural effusion, tuberculosis, Malabsorption syndromes; acid peptic diseases, Viral hepatitis and cirrhosis of liver.

Glomerulonephritis and pyelonephritis, renal failure, nephrotic syndrome, renovascular hypertension, complications of diabetes mellitus, coagulation disorders, leukaemia, Hypo and hyper thyrodism, meningitis and encephalitis.

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Imaging in medical problems, ultrasound, echo- cardiogram, CT scan, MRI.

Anxiety and Depressive Psychosis and schizophrenia and ECT.

2. Paediatrics

Immunization, Baby friendly hospital, congenital cyanotic heart disease, respiratory distress syndrome, broncho— pneumonias, kernicterus. IMNCI classification and management, PEM grading and management. ARI and Diarrhea of under five and their management.

3. Dermatology

Psoriasis, Allergic dermatitis, scabies, eczema, vitiligo, Stevan Johnson's syndrome, Lichen Planus.

4. General Surgery

Clinical features, causes, diagnosis and principles of management of cleft palate, harelip.

Laryngeal tumour, oral and esophageal tumours.

Peripheral arterial diseases, varicose veins, coarctation of aorta.

Tumours of Thyroid, Adrenal, Glands.

Abscess cancer, fibroadenoma and adenosis of breast.

Bleeding peptic ulcer, tuberculosis of bowel, ulcerative colitis, cancer stomach.

Renal mass, cancer prostatie.

Haemothorax, stones of Gall bladder, Kidney, Ureter and Urinary Bladder.

Management of surgical conditions of Rectum, Anus and Anal canal, Gall bladder and Bile ducts.

Splenomegaly, cholecystitis, portal hypertension, liver abscess, peritonitis, carcinoma head of pancreas.

Fractures of spine, Colles' fracture and bone tumors.

Endoscopy.

Laprascopic Surgery.

5. Obstetrics and Gynaecology including Family Planning

Diagnosis of pregnancy.

Labour management, complications of 3rd stage, Antepartum and postpartum hemorrhage, resuscitation of the newborn, Management of abnormal life and difficult labour. Management of small for date or premature newborn.

Diagnosis and management of anemia. Preeclampsia and Toxaemias of pregnancy, Management of Post-menopausal Syndrome.

Intra-uterine devices, pills, tubectomy and vasectomy. Medical termination of pregnancy including legal aspects.

Cancer cervix.

Leucorrhoea, pelvic pain; infertility, dysfunctional uterine bleeding (DUB), amenorrhoea, Fibroid and prolapse of uterus.

6. Community Medicine (Preventive and Social Medicine)

Principles, methods approach and measurements of Epidemiology.

Nutrition, nutritional diseases/diorders and Nutrition Programmes.

Government strives to have a workforce which reflects gender balance and women candidates are encouraged to apply.

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Health information Collection, Analysis and Presentation.

Objectives, components and critical analysis of National programmes for control/eradication of :

Malaria, Kala-azar, Filaria and Tuberculosis,

HIV/AIDS, STDs and Dengue.

Critical appraisal of Health care delivery system.

Health management and administration; Techniques, Tools, Programme Implementation and Evaluation.

Objectives, Components, Goals and Status of Reproductive and Child Health, National Rural Health Mission and Millennium Development Goals.

Management of hospital and industrial waste.

PHILOSOPHY

PAPER-I

History and Problems of Philosophy

1. Plato and Aristotle : Ideas; Substance; Form and Matter; Causation; Actuality and Potentiality.

2. Rationalism (Descartes, Spinoza, Leibniz); Cartesian Method and Certain Knowledge; Substance; God; Mind-Body Dualism; Determinism and Freedom.

3. Empiricism (Locke, Berkeley, Hume) : Theory of Knowledge; Substance and Qualities; Self and God; Scepticism.

4. Kant: Possibility of Synthetic a priori Judgments; Space and Time; Categories; Ideas of Reason; Antinomies; Critique of Proofs for the Existence of God.

5. Hegel : Dialectical Method; Absolute Idealism.

6. Moore, Russell and Early Wittgenstein : Defence of Commonsense; Refutation of Idealism; Logical Atomism; Logical Constructions; Incomplete Symbols; Picture Theory of Meaning; Sying and Showing.

7. Logical Positivism : Verification Theory of Meaning; Rejection of Metaphysics; Linguistic Theory of Necessary Propositions.

8. Later Wittgenstein : Meaning and Use; Language-games; Critique of Private Language.

9. Phenomenology (Husserl): Method; Theory of Essences; Avoidance of Psychologism.

10. Existentialism (Kierkegaard, Sarte, Heidegger): Existence and Essence; Choice, Responsibility and Authentic Existence; Being-in-the-world and Temporality.

11. Quine and Strawson : Critique of Empiricism; Theory of Basic Particulars and Persons.

12. Carvaka : Theory of Knowlegde; Rejection of Transcendent Entities.

13. Jainism : Theory of Reality; Saptabhanginaya; Bondage and Liberation.

14. Schools of Buddhism : Prat Ityasamutpada; Ksanikavada, Nairatmyavada.

15. Nyaya—Vaiesesika : Theory of Categories; Theory of Appearance; Theory of Pramana; Self, Liberation; God; Proofs for the Existence of God; Theory of Causation; Atomistic Theory of Creation.

16. Samkhya; Prakrit; Purusa; Causation; Liberation.

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17. Yoga; Citta; Cittavrtti; Klesas; Samadhi; Kaivalya.

18. Mimamsa: Theory of Knowlegde.

19. Schools of Vedanta : Brahman; Isvara; Atman; Jiva; Jagat; Maya; Avida; Adhyasa; Moksa; Aprthaksiddhi; Pancavidhabheda.

20. Aurobindo: Evolution, Involution; Integral Yoga.

PAPER-II

Socio-Political Philosophy

1. Social and Political ldeals : Equality, Justice, Liberty.
2. Sovereignty : Austin, Bodin, Laski, Kautilya.
3. Individual and State : Rights; Duties and Accountability.
4. Forms of Government : Monarchy; Theocracy and Democracy.
5. Political Ideologies: Anarchism; Marxism and Socialism.
6. Humanism; Secularism; Multi-culturalism.
7. Crime and Punishment : Corruption, Mass Violence, Genocide, Capital Punishment.
8. Development and Social Progress.
9. Gender Discrimination : Female Foeticide, Land and Property Rights; Empowerment.
10. Caste Discrimination : Gandhi and Ambedkar.

Philosophy of Religion

1. Notions of God : Attributes; Relation to Man and the World. (Indian and Western).
2. Proofs for the Existence of God and their Critique (Indian and Western).
3. Problem of Evil.
4. Soul : Immortality; Rebirth and Liberation.
5. Reason, Revelation and Faith.
6. Religious Experience : Nature and Object (Indian and Western).
7. Religion without God.
8. Religion and Morality.
9. Religious Pluralism and the Problem of Absolute Truth.
10. Nature of Religious Language : Analogical and Symbolic; Cognitivist and Non-cognitive.

PHYSICS

PAPER-I

1. (a) Mechanics of Particles :

Laws of motion; conservation of energy and momentum, applications to rotating frames, centripetal and Coriolis accelerations; Motion under a central force; Conservation of angular momentum, Kepler's laws; Fields and potentials; Gravitational field and potential due to spherical bodies, Gauss and Poisson equations, gravitational self-energy; Two-body problem; Reduced mass; Rutherford scattering; Centre of

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mass and laboratory reference frames.

(b) Mechanics of Rigid Bodies :

System of particles; Centre of mass, angular momentum, equations of motion; Conservation theorems for energy, momentum and angular momentum; Elastic and inelastic collisions; Rigid Body; Degrees of freedom, Euler's theorem, angular velocity, angular momentum, moments of inertia, theorems of parallel and perpendicular axes, equation of motion for rotation; Molecular rotations (as rigid bodies); Di and tri-atomic molecules; Precessional motion; top, gyroscope.

(c) Mechanics of Continuous Media :

Elasticity, Hooke's law and elastic constants of isotropic solids and their inter-relation; Streamline (Laminar) flow, viscosity, Poiseuille's equation, Bernoulli's equation, Stokes' law and applications.

(d) Special Relativity :

Michelson-Morely experiment and its implications; Lorentz transformations length contraction, time dilation, addition of relativistic velocities, aberration and Doppler effect, mass-energy relation, simple applications to a decay process. Four dimensional momentum vector; Covariance of equations of physics.

2. Waves and Optics :

(a) Waves :

Simple harmonic motion, damped oscillation, forced oscillation and resonance; Beats; Stationary waves in a string; Pulses and wave packets; Phase and group velocities; Reflection and refraction from Huygens' principle.

(b) Geometrial Optics :

Laws of reflection and refraction from Fermat's principle; Matrix method in paraxial optic-thin lens formula, nodal planes, system of two thin lenses, chromatic and spherical aberrations.

(c) Interference :

Interference of light -Young's experiment, Newton's rings, interference by thin films, Michelson interferometer; Multiple beam interference and Fabry Perot interferometer.

(d) Diffraction :

Fraunhofer diffraction - single slit, double slit, diffraction grating, resolving power; Diffraction by a circular aperture and the Airy pattern; Fresnel diffraction: half-period zones and zone plates, circular aperture.

(e) Polarisation and Modern Optics :

Production and detection of linearly and circularly polarized light; Double refraction, quarter wave plate; Optical activity; Principles of fibre optics, attenuation; Pulse dispersion in step index and parabolic index fibres; Material dispersion, single mode fibers; Lasers-Einstein A and B coefficients. Ruby and He-Ne lasers. Characteristics of laser light-spatial and temporal coherence; Focusing of laser beams. Three-level scheme for laser operation; Holography and simple applications.

3. Electricity and Magnetism :

(a) Electrostatics and Magnetostatics :

Laplace and Poisson equations in electrostatics and their applications; Energy of a system of charges, multipole expansion of scalar potential; Method of images and its applications. Potential and field due to a

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dipole, force and torque on a dipole in an external field; Dielectrics, polarisation. Solutions to boundary-value problems-conducting and dielectric spheres in a uniform electric field; Magnetic shell, uniformly magnetised sphere; Ferromagnetic materials, hysteresis, energy loss.

(b) Current Electricity :

Kirchhoff's laws and their applications. Biot-Savart law, Ampere's law, Faraday's law, Lenz' law. Self- and mutual- inductances; Mean and rms values in AC circuits; DC and AC circuits with R, L and C components; Series and parallel resonance; Quality factor; Principle of transformer.

4. Electromagnetic Waves and Blackbody Radiation :

Displacement current and Maxwell's equations; Wave equations in vacuum, Poynting theorem; Vector and scalar potentials; Electromagnetic field tensor, covariance of Maxwell's equations; Wave equations in isotropic dielectrics, reflection and refraction at the boundary of two dielectrics; Fresnel's relations; Total internal reflection; Normal and anomalous dispersion; Rayleigh scattering; Blackbody radiation and Planck 's radiation law- Stefan-Boltzmann law, Wien's displacement law and Rayleigh-Jeans law.

5. Thermal and Statistical Physics :

(a) Thermodynamics :

Laws of thermodynamics, reversible and irreversible processes, entropy; Isothermal, adiabatic, isobaric, isochoric processes and entropy changes; Otto and Diesel engines, Gibbs' phase rule and chemical potential; Van der Waals equation of state of a real gas, critical constants; Maxwell-Boltzmann distribution of molecular velocities, transport phenomena, equipartition and virial theorems; Dulong-Petit, Einstein, and Debye's theories of specific heat of solids; Maxwell relations and application; Clausius-Clapeyron equation. Adiabatic demagnetisation, Joule-Kelvin effect and liquefaction of gases.

(b) Statistical Physics :

Macro and micro states, statistical distributions, Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Distributions, applications to specific heat of gases and blackbody radiation; Concept of negative temperatures.

PAPER-II

1. Quantum Mechanics :

Wave-particle duality; Schroedinger equation and expectation values; Uncertainty principle; Solutions of the one-dimensional Schroedinger equation for free particle (Gaussian wave-packet), particle in a box, particle in a finite well, linear harmonic oscillator; Reflection and transmission by a step potential and by a rectangular barrier; Particle in a three dimensional box, density of states, free electron theory of metals; Angular momentum; Hydrogen atom; Spin half particles, properties of Pauli spin matrices.

2. Atomic and Molecular Physics :

Stern-Gerlach experiment, electron spin, fine structure of hydrozen atom; L-S coupling, J-J coupling; Spectroscopic notation of atomic states; Zeeman effect; Franck-Condon principle and applications; Elementary theory of rotational, vibrational and electronic spectra of diatomic molecules; Raman effect and molecular structure; Laser Raman spectroscopy; Importance of neutral hydrogen atom, molecular hydrogen and molecular hydrogen ion in astronomy. Fluorescence and Phosphorescence; Elementary theory and applications of NMR and EPR; Elementary ideas about Lamb shift and its significance.

3. Nuclear and Particle Physics :

Basic nuclear properties-size, binding energy, angular momentum, parity, magnetic moment; Semi-

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empirical mass formula and applications. Mass parabolas; Ground state of a deuteron, magnetic moment and non-central forces; Meson theory of nuclear forces; Salient features of nuclear forces; Shell model of the nucleus - success and limitations; Violation of parity in beta decay; Gamma decay and internal conversion; Elementary ideas about Mossbauer spectroscopy; Q-value of nuclear reactions; Nuclear fission and fusion, energy production in stars. Nuclear reactors.

Classification of elementary particles and their interactions; Conservation laws; Quark structure of hadrons : Field quanta of electroweak and strong interactions; Elementary ideas about unification of forces; Physics of neutrinos.

4. Solid State Physics, Devices and Electronics :

Crystalline and amorphous structure of matter; Different crystal systems, space groups; Methods of determination of crystal structure; X-ray diffraction, scanning and transmission electron microscopies; Band theory of solids—conductors, insulators and semi-conductors; Thermal properties of solids, specific heat, Debye theory; Magnetism: dia, para and ferromagnetism; Elements of super-conductivity, Meissner effect, Josephson junctions and applications; Elementary ideas about high temperature super-conductivity.

Intrinsic and extrinsic semi-conductors- p-n-p and n-p-n transistors; Amplifiers and oscillators. Op-amps; FET, JFET and MOSFET; Digital electronics-Boolean identities, De Morgan's laws, Logic gates and truth tables. Simple logic circuits; Thermistors, solar cells; Fundamentals of microprocessors and digital computers.

POLITICAL SCIENCE AND INTERNATIONAL RELATIONS

PAPER- I

Political Theory and Indian Politics :

1. Political Theory: meaning and approaches.
2. Theories of state : Liberal, Neo-liberal, Marxist, Pluiralist, post-colonial and Feminist.
3. Justice : Conceptions of justice with special reference to Rawl's theory of justice and its communitarian critiques.
4. Equality : Social, political and economic; relationship between equality and freedom; Affirmative action.
5. Rights : Meaning and theories; different kinds of rights; Concept of Human Rights.
6. Democracy : Classical and contemporary theories; different models of democracy—representative, participatory and deliberative.
7. Concept of power : hegemony, ideology and legitimacy.
8. Political Ideologies : Liberalism, Socialism, Marxism, Fascism, Gandhism and Feminism.
9. Indian Political Thought: *Dharamshastra, Arthashastra* and Buddhist Traditions; Sir Syed Ahmed Khan, Sri Aurobindo, M. K. Gandhi, B. R. Ambedkar, M. N. Roy.
10. Western Political Thought : Plato, Aristotle, Machiavelli, Hobbes, Locke, John S. Mill, Marx, Gramsci, Hannah Arendt.

Indian Government and Politics

1. Indian Nationalism :

(a) Political Strategies of India's Freedom Struggle : Constitutionalism to mass Satyagraha, Non-cooperation, Civil Disobedience; Militant and Revolutionary Movements, Peasant and Workers Movements.

(b) Perspectives on Indian National Movement; Liberal, Socialist and Marxist; Radical Humanist and

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Dalit.

2. Making of the Indian Constitution : Legacies of the British rule; different social and political perspectives.

3. Salient Features of the Indian Constitution : The Preamble, Fundamental Rights and Duties, Directive Principles; Parliamentary System and Amendment Procedures; Judicial Review and Basic Structure doctrine.

4. (a) Principal Organs of the Union Government : Envisaged role and actual working of the Executive, Legislature and Supreme Court.

(b) Principal Organs of the State Government : Envisaged role and actual working of the Executive, Legislature and High Courts.

5. Grassroots Democracy : Panchayati Raj and Municipal Government; Significance of 73rd and 74th Amendments; Grassroot movements.

6. Statutory Institutions/Commissions : Election Commission, Comptroller and Auditor General, Finance Commission, Union Public Service Commission, National Commission for Scheduled Castes, National Commission for Scheduled Tribes, National Commission for Women; National Human Rights Commission, National Commission for Minorities, National Backward Classes Commission.

7. Federalism : Constitutional provisions; changing nature of centre-state relations; integrationist tendencies and regional aspirations; inter-state disputes.

8. Planning and Economic development : Nehruvian and Gandhian perspectives; Role of planning and public sector; Green Revolution, land reforms and agrarian relations; liberalization and economic reforms.

9. Caste, Religion and Ethnicity in Indian Politics.

10. Party System : National and regional political parties, ideological and social bases of parties; Patterns of coalition politics; Pressure groups, trends in electoral behaviour; changing socio-economic profile of Legislators.

11. Social Movement : Civil liberties and human rights movements; women's movements; environmentalist movements.

PAPER-II

Comparative Politics and International Relations

Comparative Political Analysis and International Politics :

1. Comparative Politics : Nature and major approaches; Political economy and political sociology perspectives; Limitations of the comparative method.

2. State in Comparative Perspective : Characteristics and changing nature of the State in capitalist and socialist economies, and advanced industrial and developing societies.

3. Politics of Representation and Participation : Political parties, pressure groups and social movements in advanced industrial and developing societies.

4. Globalisation : Responses from developed and developing societies.

5. Approaches to the Study of International Relations : Idealist, Realist, Marxist, Functionalist and Systems theory.

6. Key Concepts in International Relations : National interest, security and power; Balance of power and deterrence; Transational actors and collective security; World capitalist economy and globalisation.

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7. Changing International Political Order :

(a) Rise of super powers; Strategic and ideological Bipolarity, arms race and cold war; Nuclear threat;

(b) Non-aligned Movement : Aims and achievements.

(c) Collapse of the Soviet Union; Unipolarity and American hegemony; Relevance of non-alignment in the contemporary world.

8. Evolution of the International Economic System : From Brettonwoods to WTO; Socialist economies and the CMEA (Council for Mutual Economic Assistance); Third World demand for new international economic order; Globalisation of the world economy.

9. United Nations : Envisaged role and actual record; Specialized UN agencies—aims and functioning; need for UN reforms.

10. Regionalisation of World Politics : EU, ASEAN, APEC, AARC, NAFTA.

11. Contemporary Global Concerns : Democracy, human rights, environment, gender justice terrorism, nuclear proliferation.

India and the World

1. Indian Foreign Policy : Determinants of foreign policy; the institutions of policy-making; Continuity and change.

2. India's Contribution to the Non-Alignment Movement Different phases; Current role.

3. India and South Asia :

(a) Regional Co-operation : SAARC-past performance and future prospects.

(b) South Asia as a Free Trade Area.

(c) India's "Look East" policy.

(d) Impediments to regional co-operation : River water disputes; illegal cross border migration; Ethnic conflicts and insurgencies; Border disputes.

4. India and the Global South : Relations with Africa and Latin America; Leadership role in the demand for NIEO and WTO negotiations.

5. India and the Global Centres of Power : USA, EU, Japan, China and Russia.

6. India and the UN System: Role in UN Peace-keeping; Demand for Permanent Seat in the Security Council.

7. India and the Nuclear Question : Changing perceptions and policy.

8. Recent developments in Indian Foreign Policy : India's position on the recent crises in Afghanistan, Iraq and West Asia, growing relations with US and Isreal; Vision of a new world order.

PSYCHOLOGY

PAPER-I

Foundations of Psychology

1. Introduction : Definition of Psychology; Historical antecedents of Psychology and trends in the 21st centrury; Psychology and scientific methods; Psychology in relation to other social sciences and natural sciences; Application of Psychology to societal problems.

2. Methods of Psychology : Types of research : Descriptive, evaluative, diagnostic and prognostic;

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Methods of Research : Survey, observation, case-study and experiments; Characteristics of experimental design and non-experimental designs; quasi-experimental designs; Focussed group discussions, brain storming, grounded theory approach.

3. Research methods : Major steps in psychological research (problem statement, hypothesis formulation, research design, sampling, tools of data collection, analysis and interpretation and report writing); Fundamental versus applied research; Methods of data collection (interview, observation, questionnaire and case study). Research Designs (Ex-post facto and experimental). Application of statistical techniques (t-test, two-way ANOVA, correlation and regression and factor analysis) item response theory.

4. Development of Human Behaviour : Growth and development; Principles of development, Role of genetic and environmental factors in determining human behaviour; Influence of cultural factors in socialization; Life span development—Characteristics, development tasks, promoting psychological well-being across major stages of the life span.

5. Sensation, Attention and Perception : Sensation: concepts of threshold, absolute and difference thresholds, signal-detection and vigilance; Factors influencing attention including set and characteristics of stimulus; Definition and concept of perception, biological factors in perception; Perceptual organization-influence of past experiences, perceptual defence-factor influencing space and depth perception, size estimation and perceptual readiness; The plasticity of perception; Extrasensory perception; Culture and perception, Subliminal perception.

6. Learning : Concepts and theories of learning (Behaviourists, Gestaltalist and Information processing models). The processes of extinction, discrimination and generalisation. Programmed learning, probability learning, self instructional learning, concepts, types and the schedules of reinforcement, escape, avoidance and punishment, modelling and social learning.

7. Memory : Encoding and remembering; Shot-term memory, Long-term memory, Sensory memory, Iconic memory, Echoic memory: The Multistore model, levels of processing; Organization and Mnemonic techniques to improve memory; Theories of forgetting: decay, interference and retrieval failure: Metamemory; Amnesia: Anterograde and retrograde.

8. Thinking and Problem Solving : Piaget's theory of cognitive development; Concept formation processes; Information processing, Reasoning and problem solving, Facilitating and hindering factors in problem solving, Methods of problem solving: Creative thinking and fostering creativity; Factors influencing decision making and judgement; Recent trends.

9. Motivation and Emotion : Psychological and physiological basis of motivation and emotion; Measurement of motivation and emotion; Effects of motivation and emotion on behaviour; Extrinsic and intrinsic motivation; Factors influencing intrinsic motivation; Emotional competence and the related issues.

10. Intelligence and Aptitude : Concept of intelligence and aptitude, Nature and theories of intelligence-Spearman, Thurstone, Gulford Vernon, Sternberg and J.P. Das; Emotional Intelligence, Social intelligence, measurement of intelligence and aptitudes, concept of I Q deviation I Q, constancy of I Q; Measurement of multiple intelligence; Fluid intelligence and crystallized intelligence.

11. Personality : Definition and concept of personality; Theories of personality (psychoanalytical, socio-cultural, interpersonal, developmental, humanistic, behaviouristic, trait and type approaches); Measurement of personality (projective tests, pencil-paper test); The Indian approach to personality; Training for personality development; Latest approaches like big 5 factor theory; The notion of self in different traditions.

12. Attitudes, Values and Interests : Definitions of attitudes, values and interests; Components of

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attitudes; Formation and maintenance of attitudes. Measurement of attitudes, values and interests. Theories of attitude changes, strategies for fostering values. Formation of stereotypes and prejudices; Changing other's behaviour, Theories of attribution; Recent trends.

13. Language and Communication : Human language—Properties, structure and linguistic hierarchy, Language acquisition—predispotion, critical period hypothesis; Theories of Language development—Skinner and Chomsky; Process and types of communication—effective commu-nication training.

14.Issues and Perspectives in Modern Contemporary Psychology : Computer application in the psychological laboratory and psychological testing; Artificial intelligence; Psychocybernetics; Study of consciousnessleep-wak schedules; dreams, stimulus deprivation, meditation, hypnotic/drug induced states; Extrasensory perception; Intersensory perception; Simulation studies.

PAPER-II

Psychology : Issues and applications

1. Psychological Measurement of Individual Differences :

The nature of individual differences. Characteristics and construction of standardized psychological tests. Types of psychological tests. Use, misuse and limitation of psychological tests. Ethical issues in the use of psychological tests.

2. Psychological well being and Mental Disorders :

Concept of health-ill health positive health, well being casual factores in Mental disorders (Anxiety disorders, mood disorders; schizophrenia and delusional disorders; personality disorders, substance abuse disorders). Factors influencing positive health, well being; lifestyle and quality of life; Happiness disposition.

3. Therapeutic Approaches :

Psychodynamic therapies. Behaviour therapies. Client centered therapy. Cognitive therapies. Indigenous therapies (Yoga, Meditation). Biofeedback therapy. Prevention and rehabilitation of the mentally ill; Fostering mental health.

4. Work Psychology and Organisational Behaviour :

Personnel selection and training. Use of Psychological tests in the industry. Training and human resource development. Theories of work motivation. Herzberg, Maslow, Adam Equity theory, Porter and Lawler, Vroom; Leadership and participatory management; Advertising and marketing; Stress and its management; Ergonomics; consumer psychology; Managerial effectiveness; Transformational leadersip; Senitivity training; Power and politics in organizations.

5. Application of Psychology to Educational Field :

Psychological principles underlying effective teaching-learning process. Learning styles. Gifted, retarded, learning disabled and their training. Training for improving memory and better academic achievement. Personality development and value education. Educational, vocational guidance and Career counselling. Use of Psychological tests in educational institutions; Effective strategies in guidance programmes.

6. Community Psychology :

Definition and concept of Community Psychology. Use of small groups in social action. Arousing Community consciousness and action for handling social problems. Group decision making and leadership for social change. Effective strategies for social change.

7. Rehabilitation Psychology :

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Primary, secondary and tertiary prevention programmes—role of psychologists. Organising of services for rehabilitation of physically, mentally and socially challenged persons including old persons. Rehabilitation of persons suffering from substance abuse, juvenile delinquency, criminal behaviours. Rehabilitation of victims of violence. Rehabilitation of HIV/AIDS victims, the role of social agencies.

8. Application of Psychology to disadvantaged groups :

The concepts of disadvantaged, deprivation social, physical, cultural and economic consequences of disadvantaged and deprived groups. Educating and motivating the disadvantaged towards development; Relative and prolonged deprivation.

9. Psychological problem of social integration :

The concept of social integration. The problem of caste, class, religion and language conflicts and prejudice. Nature and manifestation of prejudice between the ingroup and outgroup. Casual factors of such conflicts and prejudices. Psychological strategies for handling the conflicts and prejudices. Measures to achieve social integration.

10. Application of Psychology in Information Technology and Mass Media :

The present scenario of information technology and the mass media boom and the role of psychologists. Selection and training of Psychology professionals to work in the field of IT and mass media. Distance learning through IT and mass media. Entrepreneurship through e-commerce. Multilevel marketing. Impact of TV and fostering value through IT and mass media. Psychological consequences of recent developments in Information Technology.

11. Psychology and Economic development :

Achievement motivation and economic development. Characteristics of entrepreneurial behaviour. Motivating and Training people for entrepreneurship and economic development; Consumer rights and consumer awareness, Government policies for promotion of entrepreneurship among youth including women entreprenures.

12. Application of Psychology to environment and related fields :

Environmental Psychology effects of noise, pollution and crowding. Population Psychology : Psychological consequence of population explosion and high population density. Motivating for small family norms. Impact of rapid scientific and technological growth on degradation of environment.

13. Application of psychology in other fields :

(a) Military Psychology

Devising psycological tests for defence personnel for use in selection, Training, counseling; training psychologists to work , with defence personnel in promoting positive health; Human engineering in defence.

(b) Sports Psychology

Psychological interventions in improving performance of athletes and sports. Persons participating in Individual and Team Games.

(c) Media influences on pro and anti-social behaviour.

(d) Psychology of Terrorism.

14. Psychology of Gender :

Government strives to have a workforce which reflects gender balance and women candidates are encouraged to apply.

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Issues of discrimination, Management of diversity; Glass ceiling effect, Self-fulfilling prophesy, Women and Indian society.

PUBLIC ADMINISTRATION

PAPER-I

Administration Theory

1. Introduction :

Meaning, scope and significance of Public Administration, Wilson's vision of Public Administration, Evolution of the discipline and its present status. New Public Administration, Public Choice approach; Challenges of liberalization, Privatisation, Globalisation; Good Governance: concept and application; New Public Management.

2. Administrative Thought :

Scientific Management and Scientific Management movement; Classical Theory; Weber's bureaucratic model its critique and post-Weberian Developments; Dynamic Administration (Mary Parker Follett); Human Relations School (Elton Mayo and others); Functions of the Executive (C.I. Barnard); Simon's decision-making theory; Participative Management (R. Likert, C. Argyris, D. McGregor.)

3. Administrative Behaviour :

Process and techniques of decision-making; Communication; Morale; Motivation Theories content, process and contemporary; Theories of Leadership: Traditional and Modem:

4. Organisations :

Theories systems, contingency; Structure and forms: Ministries and Departments, Corporations, Companies; Boards and Commissions; Ad hoc, and advisory bodies; Headquarters and Field relationships; Regulatory Authorities; Public-Private Partnerships.

5. Accountability and Control :

Concepts of accountability and control; Legislative, Executive and judicial control over administration; Citizen and Administration; Role of media, interest groups, voluntary organizations; Civil society; Citizen's Charters; Right to Information; Social audit.

6. Administrative Law :

Meaning, scope and significance; Dicey on Administrative law; Delegated legislation; Administrative Tribunals.

7. Comparative Public Administration :

Historical and sociological factors affecting administrative systems; Administration and politics in different countries; Current status of Comparative Public Administration; Ecology and administration; Riggsian models and their critique.

8. Development Dynamics :

Concept of development; Changing profile of development administration; 'Anti-development thesis'; Bureaucracy and development; Strong state versus the market debate; Impact of liberalisation on administration in developing countries; Women and development the self-help group movement.

9. Personnel Administration :

Importance of human resource development; Recruitment, training, career advancement, position

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classification, discipline, performance appraisal, promotion, pray and service conditions; employer-employee relations, grievance redressal mechanism; Code of conduct; Administrative ethics.

10. Public Policy :

Models of policy-making and their critique; Processes of conceptualisation, planning, implementation, monitoring, evaluation and review and their limitations; State theories and public policy formulation.

11. Techniques of Adminstrative Improvement :

Organisation and methods, Work study and work management; e-governance and information technology; Management aid tools like network analysis, MIS, PERT, CPM.

12. Financial Administration :

Monetary and fiscal policies: Public borrowings and public debt Budgets types and forms; Budgetary process; Financial accountability; Accounts and audit.

PAPER-II

Indian Administration

1. Evolution of Indian Administration :

Kautilya Arthashastra; Mughal administration; Legacy of British rule in politics and administration Indianization of Public services, revenue administration, district Administration, local self Government.

.

2. Philosophical and Constitutional framework of

Government :

Salient features and value premises; Constitutionalism; Political culture; Bureaucracy and democracy; Bureaucracy and development.

3. Public Sector Undertakings :

Public sector in modern India; Forms of Public Sector Undertakings; Problems of autonomy, accountability and control; Impact of liberalization and privatization.

4. Union Government and Administration :

Executive, Parliament, Judiciary-structure, functions, work processes; Recent trends; Intra-governmental relations; Cabinet Secretariat; Prime Minister's Office; Central Secretariat; Ministries and Departments; Boards; Commissions; Attached offices; Field organizations.

5. Plans and Priorities :

Machinery of planning; Role, composition and functions of the Planning Commission and the National Development Council; 'Indicative' planning; Process of plan formulation at Union and State levels; Constitutional Amendments (1992) and decentralized planning for economic development and social justice.

6. State Government and Administration :

Union-State administrative, legislative and financial relations; Role of the Finance Commission; Governor; Chief Minister; Council of Ministers; Chief Secretary; State Secretariat; Directorates.

7. District Administration since Independence :

Changing role of the Collector; Union-State-local relations; Imperatives of development management and Government strives to have a workforce which reflects gender balance and women candidates are encouraged to apply.

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law and order administration; District administration and democratic decentralization.

8. Civil Services :

Constitutional position; Structure, recruitment, training and capacity building; Good governance initiatives; Code of conduct and discipline; Staff associations; Political rights; Grievance redressal mechanism; Civil service neutrality; Civil service activism.

9. Financial Management :

Budget as a political instrument; Parliamentary control of public expenditure; Role of finance ministry in monetary and fiscal area; Accounting techniques; Audit; Role of Controller General of Accounts and Comptroller and Auditor General of India.

10. Administrative Reforms since Independence :

Major concerns; Important Committees and Commissions; Reforms in financial management and human resource development; Problems of implementation.

11. Rural Development :

Institutions and agencies since Independence; Rural development programmes: foci and strategies; Decentralization and Panchayati Raj; 73rd Constitutional amendment.

12. Urban Local Government :

Municipal governance: main features, structures, finance and problem areas; 74th Constitutional Amendment; Global-local debate; New localism; Development dynamics, politics and administration with special reference to city management.

13. Law and Order Administration:

British legacy; National Police Commission; Investigative agencies; Role of Central and State Agencies including para military forces in maintenance of law and order and countering insurgency and terrorism; Criminalisation of politics and administration; Police-public relations; Reforms in Police.

14. Significant issues in Indian Administration:

Values in public service; Regulatory Commissions; National Human Rights Commission; Problems of administration in coalition regimes; Citizen administration interface; Corruption and administration; Disaster management.

SOCIOLOGY

PAPER– I

FUNDAMENTALS OF SOCIOLOGY

1. Sociology - The Discipline:

(a) Modernity and social changes in Europe and emergence of Sociology.

(b) Scope of the subject and comparison with other social sciences.

(c) Sociology and common sense.

2. Sociology as Science:

(a) Science, scientific method and critique.

(b) Major theoretical strands of research methodology.

(c) Positivism and its critique.

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(d) Fact value and objectivity.

(e) Non-positivist methodologies.

3. Research Methods and Analysis:

(a) Qualitative and quantitative methods.

(b) Techniques of data collection.

(c) Variables, sampling, hypothesis, reliability and validity.

4. Sociological Thinkers:

(a) Karl Marx - Historical materialism, mode of production, alienation, class struggle.

(b) Emile Durkhteim - Division of labour, social fact, suicide, religion and society.

(c) Max Weber - Social action, ideal types, authority, bureaucracy, protestant ethic and the spirit of capitalism.

(d) Talcolt Parsons - Social system, pattern variables.

(e) Robert K. Merton - Latent and manifest functions, conformity and deviance, reference groups.

(f) Mead - Self and identity.

5. Stratification and Mobility :

(a) Concepts - equality, inequality, hierarchy, exclusion, poverty and deprivation.

(b) Theories of social stratification - Structural func tionalist theory, Marxist theory, Weberian theory.

(c) Dimensions - Social stratification of class, status groups, gender, ethnicity and race.

(d) Social mobility - open and closed systems, types of mobility, sources and causes of mobility.

6. Works and Economic Life :

(a) Social organization of work in different types of society - slave society, feudal society, industrial capitalist society.

(b) Formal and informal organization of work.

(c) Labour and society.

7. Politics and Society:

(a) Sociological theories of power.

(b) Power elite, bureaucracy, pressure groups and political parties.

(c) Nation, state, citizenship, democracy, civil society, ideology.

(d) Protest, agitation, social movements, collective action, revolution.

8. Religion and Society :

(a) Sociological theories of religion.

(b) Types of religious practices: animism, monism, pluralism, sects, cults.

(c) Religion in modern society: religion and science, secularization, religious revivalism, fundamen talism.

9. Systems of Kinship:

(a) Family, household, marriage.

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(b) Types and forms of family.

(c) Lineage and descent.

(d) Patriarchy and sexual division of labour.

(e) Contem porary trends.

10. Social Change in Modern Society :

(a) Sociological theories of social change.

(b) Development and dependency.

(c) Agents of social change.

(d) Education and social change.

(e) Science, technology and social change.

PAPER–II

INDIAN SOCIETY : STRUCTURE AND CHANGE

A. Introducing Indian Society :

(i) Perspectives on the Study of Indian Society :

(a) Indology (G.S. Ghure).

(b) Structural functionalism (M. N. Srinivas).

(c) Marxist sociology (A. R. Desai).

(ii) Impact of colonial rule on Indian society :

(a) Social background of Indian nationalism.

(b) Modernization of Indian tradition.

(c) Protests and movements during the colonial period.

(d) Social reforms.

B. Social Structure:

(i) Rural and Agrarian Social Structure:

(a) The idea of Indian village and village studies.

(b) Agrarian social structure—

evolution of land tenure system, land reforms.

(ii) Caste System:

(a) Perspectives on the study of caste systems: G. S. Ghurye, M. N. Srinivas, Louis Dumont, Andre Beteille.

(b) Features of caste system.

(c) Untouchability-forms and perspectives

(iii) Tribal Communities in India:

(a) Definitional problems.

(b) Geographical spread.

(c) Colonial policies and tribes.

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(d) Issues of integration and autonomy.

(iv) Social Classes in India:

(a) Agrarian class structure.

(b) Industrial class structure.

(c) Middle classes in India.

(v) Systems of Kinship in India:

(a) Lineage and descent in India.

(b) Types of kinship systems.

(c) Family and marriage in India.

(d) Household dimensions of the family.

(e) Patriarchy, entitlements and sexual division oflabour.

(vi) Religion and Society :

(a) Religious communities in India.

(b) Problems of religious minorities.

C. Social Changes in India:

(i) Visions of Social Change in India:

(a) Idea of development planning and mixed economy.

(b) Constitution, law and social change.

(c) Education and social change.

(ii) Rural and Agrarian Transformation in India:

(a) Programmes of rural development, Community Development Programme, cooperatives, poverty alleviation schemes.

(b) Green revolution and social change.

(c) Changing modes of production in Indian agriculture.

(d) Problems of rural labour, bondage, migration.

(iii) Industrialization and Urbanisation in India:

(a) Evolution of modern industry in India.

(b) Growth of urban settlements in India.

(c) Working class: structure, growth, class mobilization.

(d) Informal sector, child labour.

(e) Slums and deprivation in urban areas.

(iv) Politics and Society :

(a) Nation, democracy and citizenship.

(b) Political parties, pressure groups, social and political elite.

(c) Regionalism and decentralization of power.

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(d) Secularization.

(v) Social Movements in Modern India :

(a) Peasants and farmers movements.

(b) Women's movement.

(c) Backward classes & Dalit movements.

(d) Environmental movements.

(e) Ethnicity and Identity movements.

(vi) Population Dynamics :

(a) Population size, growth, composition and distribution.

(b) Components of population growth: birth, death, migration.

(c) Population Policy and family planning.

(d) Emerging issues: ageing, sex ratios, child and infant mortality, reproductive health.

(vii) Challenges of Social Transformation :

(a) Crisis of development : displacement, environmental problems and sustainability.

(b) Poverty, deprivation and inequalities.

(c) Violence against women.

(d) Caste conflicts.

(e) Ethnic conflicts, communalism, religious revivalism.

(f) Illiteracy and disparities in education.

STATISTICS

PAPER–I

1. Probability :

Sample space and events, probability measure and probability space, random variable as a measurable function.
distribution function of a random variable, discrete and continuous-type random variable, probability mass function, probability density function, vector-valued random variable, marginal and conditional distributions, stochastic independence of events and of random variables, expectation and moments of a random variable, conditional expectation, convergence of a sequence of random variable in distribution, in probability, in path mean and almost everywhere, their criteria and inter-relations, Chebyshev's inequality and Khintchine's weak law of large numbers, strong law of large numbers and Kolmogoroffs theorems, probability generating function, moment generating function, characteristic function, inversion theorem, Linderberg and Levy forms of central limit theorem, standard discrete and continuous probability distributions.

2. Statistical Inference:

Consistency, unbiasedness, efficiency, sufficiency, completeness, ancillary statistics, factorization theorem, exponential family of distribution and its properties, uniformly minimum variance unbiased (UMVU) estimation, Rao Blackwell and Lehmann-Scheffe theorems, Cramer-Rao inequality for single Parameter.

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Estimation by methods of moments, maximum likelihood, least squares, minimum chisquare and modified minimum chisquare, properties of maximum likelihood and other estimators, asymptotic efficiency, prior and posterior distributions, loss function, risk function, and minimax estimator. Bayes estimators.

Non-randomised and randomised tests, critical function, MP tests, Neyman-Pearson lemma, UMP tests, monotone likelihood ratio: similar and unbiased tests, UMPU tests for single paramet likelihood ratio test and its asymptotic distribution. Confidence bounds and its relation with tests.

Kolmogorov's test for goodness of fit and its consistency, sign test and its optimality. Wilcoxon signedranks test and its consistency, Kolmogorov-Smirnov two sample test, run test, Wilcoxon-Mann-Whitney test and median test, their consistency and asymptotic normality.

Wald's SPRT and its properties, Oc and ASN functions for tests regarding parameters for Bernoulli, Poisson, normal and exponential distributions. Wald's fundamental identity.

3. Linear Inference and Multivariate Analysis :

Linear statistical models, theory of least squares and analysis of variance, Gauss-Markoff theory, normal equations, least squares estimates and their precision, test of significance and interval estimates based on least squares theory in oneway, two-way and three-way classified data, regression analysis, linear regression, curvilinear regression and orthogonal polynomials, multiple regression, multiple and partial correlations, estimation of variance and covariance components, multivariate normal distribution, Mahalanobis's D^2 and Hotelling's T^2 statistics and their applications and properties, discriminant analysis, canonical correlations, principal component analysis.

4. Sampling Theory and Design of Experiments :

An outline of fixed-population and super-population approaches, distinctive features of finite population sampling, propability sampling designs, simple random sampling with and without replacement, stratified random sampling, systematic sampling and its efficacy, cluster sampling, twostage and multi-stage sampling, ratio and regression methods of estimation involving one or more auxiliary variables, two-phase sampling, probability proportional to size sampling with and without replacement, the Hansen-Hurwitz and the HorvitzThompson estimators, non-negative variance estimation with reference to the Horvitz-Thompson estimator, non-sampling errors.

Fixed effects model (two-way classification) random and mixed effects models (two-way classification with equal observation per cell), CRD, RBD, LSD and their analyses, incomplete block designs, concepts of orthogonality and balance, BIBD, missing plot technique, factorial experiments and 2^4 and 3^2, confounding in factorial experiments, split-plot and simple lattice designs, transformation of data Duncan's multiple range test.

PAPER II

1. Industrial Statistics

Process and product control, general theory of control charts, different types of control charts for variables and attributes, X, R, s, p, np and charts, cumulative sum chart. Single, double, multiple and sequential sampling plans for attributes, OC, ASN, AOQ and ATI curves, concepts of producer's and consumer's risks, AQL, LTPD and AOQL, Sampling plans for variables, Use of Dodge-Romin tables.

Concept of reliability, failure rate and reliability functions, reliability of series and parallel systems and other simple configurations, renewal density and renewal function, Failure models: exponential, Weibull, normal, lognormal. Problems in life testing, censored and truncated experiments for exponential models.

2. Optimization Techniques :

Different types of models in Operations Research, their construction and general methods of solution,

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simulation and Monte-Carlo methods formulation of Linear Programming (LP) problem, simple LP model and its graphical solution, the simplex procedure, the two-phase metbod and the M-technique with artificial variables, the duality theory of LP and its economic interpretation, sensitivity analysis, transpotation and assignment problems, rectangular games, two-person zerosum games, methods of solution (graphical and algebraic).

Replacement of failing or deteriorating items, group and individual replacement policies, concept of scientific inventory management and analytical structure of inventory problems, simple models with deterministic and stochastic demand with and without lead time, storage models with particular reference to dam type.

Homogeneous discrete-time Markov chains, transition probability matrix, classification of states and ergodic theorems, homogeneous continuous-time Markov chains, Poisson process, elements of queuing theory, M/MI, M/M/K, G/M/l and M/G/1 queues.

Solution of statistical problems on computers using wellknown statistical software packages like SPSS.

3. Quantitative Economics and Official Statistics:

Determination of trend, seasonal and cyclical components, Box-Jenkins method, tests for stationary series, ARIMA models and determination of orders of autoregressive and moving average components, fore-casting.

Commonly used index numbers - Laspeyre's, Paasche's and Fisher's ideal index numbers, cham-base index number, uses and limitations of index numbers, index number of wholesale prices, consumer price, agricultural production and industrial production, test fot index numbers -proportionality, time-reversal, factor-reversal and circular.

General linear model, ordinary least square and generalized least squares methods of estimation, problem of multi-collinearity, consequences and solutions of multi-collinearity, autocorrelation and its consequences, heteroscedasticity of disturbances and its testing, test for independence of disturbances concept of structure and model for simultaneous equations, problem of identification-rank and order conditions of identifiability, two-stage least sauare method of estimation.

Present official statistical system in India relating to population, agriculture, industrial production, trade and prices, methods of collection of official statistics, their reliability and limitations, principal publications containing such statistics, various official agencies responsible for data collection and their main functions.

4. Demography and Psychometry :

Demographic data from census, registration, NSS other surveys, their limitations. and uses, definition, construction and uses of vital rates and ratios, measures of fertility, reproduction rates, morbidity rate, standardized death rate, complete and abridged life tables, construction of life tables from vital statistics and census returns, uses of life tables, logistic and other population growth curves, fitting a logistic curve, population projection, stable population, quasi-stable population, techniques in estimation of demographic parameters, standard classification by cause of death, health surveys and use of hospital statistics.

Methods of standardisation of scales and tests, Z-scores, standard scores, T-scores, percentile scores, intelligence quotient and its measurement and uses, validity and reliability of test scores and its determination, use of factor analysis and path analysis in psychometry.

ZOOLOGY

PAPER–I

1. Non-chordata and Chordata :

(a) Classification and relationship of various phyla up to subclasses: Acoelomate and Coelomate,

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Protostomes and Deuterostomes, Bilateria and Radiata; Status of Protista, Parazoa, Onychophora and Hemichordata; Symmetry.

(b) Protozoa: Locomotion, nutrition, reproduction, sex; General features and life history of *Paramaecium, Monocystis. Plasmodium* and *Leishmania.*

(c) Porifera: Skeleton, canal system and reproduction.

(d) Cnidaria: Polymorphism, defensive structures and their mechanism; coral reefs and their formation; metagenesis; general features and life history of *Obelia* and *Aurelia.*

(e) Platyhelminthes: Parasitic adaptation; general features and life history of Fasciola and Taenia and their-Pathogenic symptoms.

(f) Nemathelminthes: General features, life history, parasitic adaptation of Ascaris and *Wuchereria.*

(g) Annelida: Coelom and metamerism; modes of life in polychaetes; general features and life history of Nereis, earthworm and leach.

(h) Arthropoda: Larval forms and parasitism in Crustacea; vision and respiration in arthropods (Prawn, cockroach and scorpion); modification of mouth, parts in insects (cockroach, mosquito, housefly, honey bee and butterfly), metapmor phosis in insect and its hormonal regulation, socialbehaviour ofApis and termites.

(i) Molluscs: Feeding, respiration, locomotion, general features and life history of Lamellidens, Pila and Sepia. Torsion and detorsion in gastropods.

(j) Echinodermata: Feeding, respiration, locomotion, larval forms, general features and life history of *Asterias*.

(k) Protochordata: Origin of chordates; general features and life history of *Branchiostoma* and *Herdmania.*

(l) Pisces: Respiration, locomotion and migration.

(m) Amphibia: Origin of tetrapods, parental care, paedomorphosis.

(n) Reptilia; Origin of reptiles, skull types, status of *Sphenodon* and crocodiles.

(o) Aves: Origin of birds, flight adaptation, migration.

(p) Mammalia: Origin of mammals, dentition, general features of egg laying mammals, pouched-mammals, aquatic mammals and primates, endocrine glands (pituitary, thyroid, parathyroid, adrenal, pancreas, gonads) and their interrelationships.

(q) Comparative functional anatomy of various systems of vertebrates. (integument and its derivatives, endoskeleton, locomotory organs, digestive system,. respiratory system, circulatory system including heart and aortic arches, urinogenital system, brain and sense organs (eye and ear).

2. Ecology :

(a) Biosphere: concept of biosphere; biomes, Biogeochemical cycles, Human induced changes in atmosphere including green house effect, ecological succession, biomes and ecotones, community ecology.

(b) Concept of ecosystem; structure and function of ecosystem, types of ecosystem, ecological succession, ecological adaptation.

(c) Population; characteristics, population dynamics, population stabilization.

(d) Biodiversity and diversity conservation of natural resources.

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(e) Wildlife of India.

(f) Remote sensing for sustainable development.

(g) Environmental biodegradation; pollution and its impact on biosphere and its prevention.

3. Ethology :

(a) Behaviour: Sensory filtering, responsiveness, sign stimuli, learning, and memory, instinct, habituation, conditioning, imprinting.

(b) Role of hormones in drive; role of pheromones in alarm spreading; crypsis, predator detection, predator tactics, social hierarchies in primates, social organization in insects;

(c) Orientation, navigation, homing; biological rhythms: biological clock, tidal, seasonal and circadian rhythms.

(d) Methods of studying animal behaviour including sexual conflict, selfishness, kinship and altruism.

4. Economic Zoology :

(a) Apiculture, sericulture, lac culture, carp culture, pearl culture, prawn culture, vermiculture.

(b) Major infectious and communicable diseases (malaria, filaria, tuberculosis, cholera and AIDS) their vectors, pathogens and prevention.

(c) Cattle and livestock diseases, their pathogen (helminths) and vectors (ticks, mites, Tabanus, Stomoxys).

(d) Pests of sugar cane (*Pyrilla perpusiella*), oil seed *(Achaeajanata)* and rice *(Sitophilus oryzae).*

(e) Transgenic animals.

(f) Medical biotechnology, human genetic disease and genetic counselling, gene therapy.

(g) Forensic biotechnology.

5. Biostatistics :

Designing of experiments; null hypothesis; correlation, regression, distribution and measure of central tendency, chi square, student-test, F-test (one-way & two-way F-test).

6. Instrumentation methods :

(a) Spectrophotometer, phase contrast and fluorescence microscopy, radioactive tracer, ultra centrifuge, gel . electrophoresis, PCR, ELISA, FISH and chromosome painting.

(b) Electron microscopy (TEM, SEM).

PAPER II

1. Cell Biology :

(a) Structure and function of cell and its organelles (nucleus, plasma membrane, mitochondria, Golgi bodies, endoplasmic reticulum, ribosomes and lysosomes), cell division (mitosis and meiosis), mitotic spindle and mitotic apparatus, chromosome movement chromosome type ploytene and lambrush, organization of chromatin, heterochromatin, Cell cycle regulation.

(b) Nucleic acid topology, DNA motif, DNA replication, transcription, RNA processing, translation, protein foldings and transport.

2. Genetics :

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(a) Modern concept of gene, split gene, genetic regulation, genetic, code.

(b) Sex chromosomes and their evolution, sex determination in Drosophila and human.

(c) Mendel's laws of inheritance, recombination, linkage, multiple alleles, genetics of blood groups, pedigree analysis, hereditary diseases in human.

(d) Mutations and mutagenesis.

(e) Recombinant DNA technology, plasmid, cosmid, artificial chromosomes as vectors, transgenics, DNA cloning and whole animal cloning (principles and methods).

(f) Gene regulation and expression in prokaryotes and eukaryotes.

(g) Signal molecules, cell death, defects in signaling pathway and consequences.

(h) RFLP, RAPD and AFLF and application of RFLP in DNA finger-printing, ribozyme technologies, human genome project, genomics and protomics.

3. Evolution :

(a) Theories of origin of life.

(b) Theories of evolution; Natural selection, role of mutation in evolution, evolutionary patterns, molecular drive, mimicry, variation, isolation and speciation.

(c) Evolution of horse, elephant and human using fossil data.

(d) Hardy-Weinberg Law.

(e) Continental drift and distribution of animals.

4. Systematics :

Zoological nomenclature, international code, cladistics, molecular taxonomy and biodiversity.

5. Biochemistry :

(a) Structure and role of carbohydrates, fats, fatty acids, cholesterol, proteins and amino-acids, nucleic acids. Bioenergetics.

(b) Glycolysis and Krebs cycle, oxidation and reduction, oxidative phosphorylation; energy conservation and release, ATP, cycl cyclic AMP-its structure and role.

(c) Hormone classification (steroid and peptide hormones), biosynthesis and functions.

(d) Enzymes: types and mechanisms of action.

(e) Vitamins and co-enzymes.

(f) Immunoglobulin and immunity.

6. Physiology (with special reference to mammals) :

(a) Composition and constituents of blood; blood groups and Rh factor in human; factors and mechanism of coagulation; iron metabolism, acid-base balance, thermo regulation, anticoagulants.

(b) Haemoglobin: Composition, types and role in transport of oxygen and carbon dioxide.

(c) Digestion and absorption: Role of salivary glands, liver, pancreas and intestinal glands.

(d) Excretion: nephron and regulation of urine formation; osmo-regulation and excretory product.

(e) Muscles: Types, mechanism of contraction of skeletal muscles, effects of exercise on muscles.

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(f) Neuron: nerve impulse—its conduction and synaptic transmission; neurotransmitters.

(g) Vision, hearing and olfaction in human.

(h) Physiology of reproduction puberty and menopause in human.

7. Developmental Biology :

(a) Gametogenesis; spermatogenesis, composition of semen, in vitro and in vivo capacitation of mammalian sperm, Oogenesis, totipotency; fertilization, morphogenesis and morphogen; blastogeneis, establishment of body axes formation, fate map, gestulation in frog and chick; genes in development in chick homeotic genes, development of eye and heart, placenta in mammals.

(b) Cell lineage, cell to cell interaction, Genetic and induced teratogenesis, role of thyroxine in control of metamorphosisin amphibia, paedogenesis and neoteny, cell death, aging.

(c) Developmental genes in human, in vitro fertilization; and embryo transfer; cloning.

(d) Stem cells: Sources, types and their use in human welfare.

(e) Biogenetic law.

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APPENDIX- II

INSTRUCTIONS TO THE CANDIDATES FOR FILLING ONLINE APPLICATIONS

- Candidates are required to apply Online using the website www.upsconline.gov.in.
- Salient features of the system of Online Application Form are given hereunder:
- Detailed instructions for filling up online applications are available on the above mentioned website.
- Candidates will be required to complete the Online Application Form containing four stages viz. Part-I (OTR) Profile , Part-II (Application Form), Part-III (DAF) & Part-IV (Fees, Photograph, Signature & Examination Centre Selection).
- The candidates are required to pay a fee of Rs.100/- Rupees One Hundred only) [Except SC/ST/ Female/Persons with Benchmark Disability candidates who are exempted from payment of fee] either by remitting the money in any branch of State Bank of India by cash, or by using net banking facility of any bank or by using any Visa/Master/RuPay/Credit/ Debit Card/UPI Payment.
- Before start filling up Online Application, a candidate must have his photograph and signature duly scanned in the .jpg format in such a manner that each file should not exceed 300 KB each and must not be less than 20 KB in size for the photograph and signature.
- The candidate should have details of one Photo ID Card viz. Aadhar Card/ Voter Card (EPIC) / PAN Card / Passport/ Driving License / Any other photo ID card issued by the State / Central Government. The details of this photo ID will have to be provided by the candidate while filling up the online application form. This photo ID will be used for all future references and the candidate is advised to carry this Photo ID while appearing for the Examination/Personality Test.
- The Online applications (Part I, Part-II, Part-III and Part-IV) can be filled from 22nd January, 2025 to 11th February, 2025 till 18:00 Hrs.
- Applicants should ~~avoid~~ not submit multiple applications.
- The applicants must ensure that while filling their Application Form, they are providing their valid and active E-Mail IDs as the Commission may use electronic mode of communication while contacting them at different stages of examination process.
- The applicants are advised to check their emails at regular intervals and ensure that the email addresses ending with @ nic.in and @ gov.in are directed to their inbox folder and not to the SPAM folder or any other folder.
- Candidates are strongly advised to apply online well in time without waiting for the last date for submission of Online Applications.

APPENDIX-III

IMPORTANT INSTRUCTIONS TO WITHDRAW APPLICATION

The cadidates will not be allowed to withdraw their applications after the submission of the same.

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APPENDIX-IV

Special Instructions to Candidates for objective type tests

1. **Articles permitted inside Examination Hall**
Clip board or hard board (on which nothing is written), a good quality black ball pen for making responses on the Answer Sheet. Answer Sheet and sheet for rough work will be supplied by the Invigilator.
2. **Articles not permitted inside Examination Hall**
Do not bring into the Examination Hall any article other than those specified above, e.g., books, notes, loose sheets, electronic or any other type of calculators, mathematical and drawing instruments, Log Tables, stencils of maps, slide rules, Test Booklets and rough sheets pertaining to earlier session(s), etc.
Mobiles phones, pagers, bluetooth or any other communication devices are not allowed inside the premises where the examination is being conducted. Any infringement of these instructions shall entail disciplinary action including ban from future examinations.
Candidates are advised in their own interest not to bring any of the banned items including mobile phones/pagers/bluetooth to the venue of the examination, as arrangements for safekeeping cannot be assured.
Candidates are advised not to bring any valuable/costly items to the Examination Halls, as safe keeping of the same cannot be assured. Commission will not be responsible for any loss in this regard.
Penalty for wrong Answers
3. ***THERE WILL BE PENALTY (NEGATIVE MARKING) FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS.***
(i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one third (0.33)** of the marks assigned to that question will be deducted as penalty.
(ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct and there will be same penalty as above for that question.
(iii) If a question is left blank i.e. no answer is given by the candidate, there will be **no penalty** for that question.
4. **Unfair means strictly prohibited**
No candidate shall copy from the papers of any other candidate nor permit his papers to be copied nor give nor attempt to give nor obtain nor attempt to obtain irregular assistance of any description.
5. **Conduct in Examination Hall**
No candidate should misbehave in any manner or create disorderly scene in the Examination Hall or harass the staff employed by the Commission for the conduct of the examination. Any such misconduct will be severely penalised.
6. **Answer Sheet particulars**
(i) Write in black ball pen your Centre and subject followed by test booklet series (in bracket), subject code and roll number at the appropriate space provided on the answer sheet at the top. Also encode your booklet series (A, B, C or D, as the case may be), subject code and roll number in the circles provided for the purpose in the answer sheet. The guidelines for writing the above particulars and for encoding the above particulars are given in Annexure. In case the booklet series is not printed on the test booklet or answer sheet is un-numbered, please report immediately to the Invigilator and get the test booklet/answer sheet replaced.
(ii) All corrections and changes in writing the roll number must be initialed by the candidates as well as by the Invigilator and countersigned by the Supervisor.
(iii) Immediately after commencement of the examination please check that the test booklet supplied to you does not have any unprinted or torn or missing pages or items etc. If so, get it replaced by a complete test booklet of the same series and subject.
7. Do not write your name or anything other than the specific items of information asked for, on the answer sheet/test booklet/sheet for rough work.
8. Do not fold or mutilate or damage or put any extraneous marking in the Answer Sheet. Do not write anything on the reverse of the answer sheet.
9. Since the answer sheets will be evaluated on computerised machines, candidates should exercise due care in handling and filling up the answer sheets. **They should use black ball pen only to darken the circles. For writing in boxes also, they should use black ball pen. Since the entries made by the candidates by darkening the circles will be taken into account while evaluating the answer sheets on computerised machines, they should make these entries very carefully and accurately.**
10. **Method of marking answers**
In the "OBJECTIVE TYPE" of examination, you do not write the answers. For each question (hereinafter referred to as "Item") several suggested answers (hereinafter referred to as "Responses") are given. You have to choose one response to each item.
The question paper will be in the Form of TEST BOOKLET. The booklet will contain item bearing numbers 1, 2, 3 ..... etc. Under each item, Responses marked (a), (b), (c), (d) will be given. Your task will be to choose the correct response. If you think there is more than one correct response, then choose what you consider the best response.
In any case, for each item you are to select only one response. If you select more than one response, your response will be considered wrong. In the Answer Sheet, Serial Nos. from 1 to 160 are printed. Against each numbers, there are circles marked (a), (b), (c) and (d). After you have read each item in the Test Booklet and decided which one of the given responses is correct or the best, **you have to mark your response by completely blackening with black ball pen to indicate your response.**
For example, if the correct answer to item 1 is (b), then the circle containing the letter (b) is to be completely blackened with black ball pen as shown below :-
Example : (a) ● (c) (d)
11. **Entries in Scannable Attendance List**
Candidates are required to fill in the relevant particulars with black ball pen only against their columns in the Scannable Attendance List, as given below:-
i) Blacken the circle [P] under the column [Present/Absent]
ii) Blacken the relevant circle for Test Booklet Series
iii) Write Test Booklet Serial No.
(iv) Write the Answer Sheet Serial No. and also blacken the corresponding circles below.
v) Append signature in the relevant column
12. Please read and abide by the instructions on the cover of Test Booklet. If any candidate indulges in disorderly or improper conduct, he will render himself liable for disciplinary action and/or imposition of a penality as the Commission may deem fit.

ANNEXURE

How to fill in the Answer Sheet of objective type tests in the Examination Hall

Please follow these instructions very carefully. You may note that since the answer sheets are to be evaluated on machine, any violation of these instructions may result in reduction of your score for which you would yourself be responsible.

Before you mark your responses on the Answer Sheet, you will have to fill in various particulars in it.

As soon as the candidate receives the Answer Sheet, he should check that it is numbered at the bottom. If it is found un-numbered he should at once get it replaced by a numbered one.

You will see from the Answer Sheet that you will have to fill in the top line, which reads thus :

केंद्र	विषय	विषय कोड		अनुक्रमांक	
Centre	**Subject**	**S.Code**		**Roll Number**	

If you are, say, appearing for the examination in Delhi Centre for the General Ability Test Papers* and your Roll No. is 0812769, and your test Booklet series is 'A' you should fill in thus, using black ball pen.

केंद्र	विषय	विषय कोड		अनुक्रमांक	
Centre Delhi	subject Mathe-matics (A)	S.Code	0 1	Roll Number	0 8 1 2 7 6 9

You should write with black ball pen the name of the centre and subject in English or Hindi.

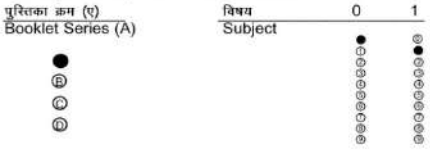
The test Booklet Series is indicated by Alphabets A, B, C or D at the top right hand corner of the Booklet.

Write your Roll Numbers exactly as it is in your e-Admission Certificate with black ball pen in the boxes provided for this purpose. Do not omit any zero(s) which may be there.

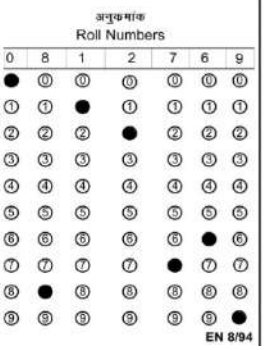
The next step is to find out the appropriate subject code from the Time Table. Now encode the Test Booklet Series, Subject Code and the Roll Number in the circles provided for this purpose. Do the encoding with black ball pen. The name of the Centre need not be encoded.

Writing and encoding of Test Booklet Series is to be done after receiving the Test Booklet and confirming the Booklet Series from the same.

For Mathematics * subject paper of 'A' Test Booklet Series you have to encode the subject code, which is 01. Do it thus:



All that is required is to blacken completely the circle marked 'A' below the Booklet Series and below the subject code blacken completely the Circles for "0" (in the first vertical column) and "1" (in the second vertical column). You should then encode the Roll No. 0812769. Do it thus similarly :



Important : Please ensure that you have carefully encoded your subject, Test Booklet series and Roll Number.

*This is just illustrative and may not be relevant to your Examination.

davp 55104/14/0012/1516 EN 8/94

Government strives to have a workforce which reflects gender balance and women candidates are encouraged to apply.

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Appendix –V

Certificate regarding physical limitation in an examinee to write

This is to certify that, I have examined Mr./Ms./Mrs..... (name of the candidate with benchmark disability), a person with ..... (nature and percentage of disability as mentioned in the certificate of disability), S/o/D/o....., a resident of ..... (Village/District/State) and to state that he/she has physical limitation which hampers his/her writing capabilities owing to his/her disability.

Signature

Chief Medical Officer/Civil Surgeon /
Medical Superintendent of a Government Healt Care Institution.

Note: Certificate should be given by a specialist of the relevant stream/disability (eg. Visual Impairment – Ophthalmologist, Locomotor disability – Orthopaedic specialist/PMR).

Appendix –VI

Letter of Undertaking for Using Own Scribe
(To be filled by the candidates online to the Commission)

I....., a candidate with.....(name of the disability) appearing for the ..... (name of the examination)..... bearing Roll No..... at ..... (name of the centre) in the District ....., ... (name of the State). My qualification is .....

I do hereby state that ..... (name of the scribe) will provide the service of scribe/reader/lab assistant for the undersighned for taking the aforesaid examination.

I do hereby undertake that his qualification is ..... In case, subsequently it is found that his/her qualification is not as declared by the undersigned and is beyond my qualification, I shall forfeit my right to the post and claims thereto.

(Signature of the candidates with Disability)

Place:
Date:

Government strives to have a workforce which reflects gender balance and women candidates are encouraged to apply.

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Appendix-VII

Certificate for person with specified disability covered under the definition of Section 2(s) of the RPwD Act, 2016 but not covered under the definition of Section 2(r) of the said Act, i.e. persons having less than 40% disability and having difficulty in writing

This is to certify that, we have examined Mr./Ms./Mrs..... (name of the candidate), S/o / D/o ....., a resident of ..... (Vill/PO/PS/District/State), aged.....yrs, a person with ..... (nature of disability/condition), and to state that he/she has limitation which hampers his/her writing capability owing to his/her above condition. He/she requires support of scribe for writing the examination.

2. The above candidate uses aids and assistive device such as prosthetics & orthotics, hearing aid (name to be specified) which is /are essential for the candidate to appear at the examination, with the assistance of scribe.

3. This certificate is issued only for the purpose of appearing in written examinations conducted by recruitment agencies as well as academic institutions and is valid upto ..... (it is valid for maximum period of six months or less as may be certified by the medical authority)

Signature of medical authority

(Signature & Name)	(Signature & Name)	(Signature & Name)	(Signature & Name)	(Signature & Name)
Orthopedic/PMR Specialist	Clinical phychologist/ Rehabilitation Psychologist / Psychiatrist / Special Educator	Neurologist (if available)	Occupational therapist (if available)	Other Expert, as nominated by the Chairperson (if any)
(Signature & Name)				
Chief Medical Officer / Civil Surgeon / Chief District Medical Officer ..... Chairperson				

Name of Government Hospital / Health Care Centre with seal

Place :

Date :

Government strives to have a workforce which reflects gender balance and women candidates are encouraged to apply.

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Appendix-VIII

Letter of Undertaking by the person with specified disability covered under the definition of Section 2(s) of the RPwD Act, 2016 but not covered under the definition of Section 2(r) of the said Act, i.e. persons having less than 40% disability and having difficulty in writing

I....., a candidate with ..... (nature of disability/condition) appearing for the ..... (name of the examination) bearing Roll No..... at ..... (name of the centre) in the District ....., ... (name of the state). My educational qualification is .....

2. I do hereby state that ..... (name of the scribe) will provide the service of scribe for the undersigned for taking the aforementioned examination.

3. I do hereby undertake that his qualification is ..... In case, subsequently it is found that his qualification is not as declared by the undersigned and is beynd my qualification. I shall forefeit my right to the post or certificate/diploma/degree and claims relating thereto.

(Signature of the candidate)

Place :

Date :

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UNION PUBLIC SERVICE COMMISSION

EXAMINATION NOTICE NO.06/2025-IFoS DATED 22.01.2025

(LAST DATE FOR SUBMISSION OF ONLINE APPLICATIONS: 11.02.2025)

INDIAN FOREST SERVICE EXAMINATION, 2025

(Commission's website - https://upsc.gov.in)

IMPORTANT

- CANDIDATES APPLYING FOR INDIAN FOREST SERVICE EXAMINATION SHOULD NOTE THAT THEY ARE REQUIRED TO APPEAR IN THE CIVIL SERVICES (PRELIMINARY) EXAMINATON AND QUALIFY THE SAME FOR GOING TO THE SECOND STAGE OF INDIAN FOREST SERVICE (MAIN) EXAMINATION (WRITTEN AND INTERVIEW).
- CANDIDATES DESIROUS OF APPLYNG FOR INDIAN FOREST SERVICE EXAMINATION AS WELL AS FOR CIVIL SERVICES EXAMINATION CAN APPLY THROUGH A COMMON ONLINE APPLICATION FORM SUBJECT TO MEETING THE REQUISITE ELIGIBILITY CRITERIA BY THEM.

1. CANDIDATES TO ENSURE THEIR ELIGIBILITIY FOR THE EXAMINATION:

All candidates (male/female/transgender) are requested to carefully read the Rules of Indian Forest Service Examination notified by the Government (Ministry of Environment, Forest and Climate Change) and this Notice of Examination derived from these Rules**.**
Candidates applying for the examination should ensure that they fulfill all eligibility conditions for admission to the Examination. Their admission at all the stages of the examination will be purely provisional subject to satisfying the prescribed eligibility conditions. **Mere issue of Admission Certificate to the candidate will not imply that his/her candidature has been finally cleared by the Commission.** Verification of eligibility conditions with reference to original documents is taken up only after the candidate has qualified for Interview/Personality Test. The Commission takes up verification of eligibility conditions with reference to original documents only after the candidate has qualified for Interview/ Personality Test.

2. HOW TO APPLY

Candidates are required to apply Online only by using the website https://upsconline.gov.in . It is essential for the applicant to register himself/herself first at One Time Registration (OTR) platform, available on the Commission's website, and then proceed for filling up the online application for the examination. OTR Profile (Registration) has to be registered only once in life time. This can be done anytime throughout the year. If the candidate is already registered, he/she can proceed straightway for filling up the online application for the examination.

2.1 Modification in OTR Profile (Registration):

Incase, the candidate wants to effect any change in his/her OTR Profile (Registration), it shall be allowed only once in the lifetime after the registration at OTR platform. The change in OTR profile (Registration) data shall be available till expiry of 07 days from the next day after the closure of application window of his/her first final application for any Examination of the Commission. In the case, the candidate after registration applies for the first time in this examination last date of modification of OTR Profile (Registration) would be **18.02.2025**.

2.2 Modification in application form (Other than OTR Profile):

The Commission has also decided to extend the facility of making correction(s) in

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any field(s) of the finally submitted online application form for this examination from next day of the closure of the application window of this Examination. This window will remain open for 07 days from the date of opening of the same, i.e., from **12.02.2025 to 18.02.2025**. In case a candidate wants to carry out any change in his/her OTR (Registration) profile during this period, then he/she should log into the OTR Profile (Registration) platform and do the needful accordingly. In other words, no change in the OTR Profile (Registration) profile can be made by visiting the window for Modification in application form.

2.3 Withdrawal of Application: The candidates will not be allowed to withdraw their applications after submission of the same.
Brief instructions are for filling up the online Applications Form have been given in Appendix-II. Detailed instructions for filling up online applications are available on the above mentioned website.

2.4 Candidate should have details of one Photo ID Card viz. Aadhaar Card/Voter Card (EPIC) /PAN Card/ Passport/Driving Licence/Any other Photo ID Card issued by the State/Central Government. The details of this Photo ID Card will have to be provided by the candidate while filling up the online application form. The candidates will have to upload a scanned copy of the Photo ID whose details have been provided in the online application by him/her. This Photo ID Card will be used for all future referencing and the candidate is advised to carry this Photo ID Card while appearing for Examination/Personality Test.

3. LAST DATE OF SUBMISSION OF APPLICATIONS:

The Online Applications can be filled up to **11th February, 2025 till 18:00 Hours**.

4. The eligible candidates shall be issued an e-Admit Card on the last working day of the preceding week of the date of Examination. The e-Admit Card will be made available in the UPSC website [**https://upsconline.gov.in]** for downloading by candidates. No Admit Card will be sent by post. All the applicants are required to provide valid active E-Mail I.D. while filling up Online Application Form as the Commission may use electronic mode for contacting them at different stages of examination process.

5. PENALTY FOR WRONG ANSWERS :

Candidates should note that there will be penalty **(Negative Marking)** for wrong answers marked by a candidate in the Objective Type Question Papers.

6. Online Question Paper Representation Portal (QPRep):

The Commission has introduced a time frame of 7 days (a week) i.e. from the next day of the Examination Date to 6:00 p.m. of the 7th day is fixed for the candidates to make representations to the Commission on the questions asked in the Papers of the Examination. Such representation must be submitted through the "Online Question Paper Representation Portal (QPRep)" only by accessing the URL https://upsconline.gov.in/miscellaneous/QPRep/. No representation by email/ post/ hand or by any other mode shall be accepted and the Commission shall not involve into any correspondence with the candidates in this regard. No representation shall be accepted under any circumstances after this window of 7 days is over.

7. For both writing and marking answers in the OMR sheet [Answer Sheet], candidates must use black ball pen only. Pens with any other colours are prohibited.

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Do not use Pencil or Ink pen. Candidates are further advised to read carefully the "Special Instructions" contained in Appendix-III of the Notice.

8. FACILITATION COUNTER FOR GUIDANCE OF CANDIDATES :

In case of any guidance/information/clarification regarding their applications, candidature etc. candidates can contact UPSC's Facilitation Counter near 'C' Gate of its campus in person or over Telephone No. 011-23385271/011-23381125/011-23098543 on working days between 10:00 hrs. and 17:00 hrs.

9. Mobile Phones Banned:

(a)The use of any mobile phone (even in switched off mode), pager or any electronic equipment or programmable device or storage media like pen drive, smart watches etc. or camera or blue tooth devices or any other equipment or related accessories either in working or switched off mode capable of being used as a communication device during the examination is strictly prohibited. Any infringement of these instructions shall entail disciplinary action including ban from future examinations.
(b) Candidates are advised in their own interest not to bring any of the banned items including mobile phones/pagers to the venue of the examination, as no arrangement for safe-keeping will be made at the venue of the Examination. Commission will not be responsible for any loss in this regard.

10. Candidates are advised not to bring any valuable/costly items to the venue of the examination, as no arrangement for safe-keeping will be made at the venue of the examination. Commission will not be responsible for any loss in this regard.

11. Instruction in respect of uploading of Photograph while filling up online application form :-

(a) The photograph, uploaded by candidate should not be more than 10 days old from the start of the online application process (i.e. the application commencement date).
(b) Ensure that **the name of candidate** and **the date on which the photograph was taken** are clearly mentioned on the photograph.
(c) The candidate's **face** should occupy **3/4th of the space** in the photograph.
(d) The candidates must ensure that their appearance must match with their photograph at each stage of the Examination Process i.e. at the time of Preliminary, Main (Written) and Interview/Personality Test. For instance, if a candidate uploads a bearded photograph, he must appear with the same look in the Preliminary, Main (Written) and Interview/ Personality Test. Same would be the case with spectacles, moustaches, etc.

12. The candidates should reach the venue of the Examination well in time at least 30 minutes prior to the commencement of each session of the Examination. No late entry will be allowed inside the Exam-venue under any circumstances.

CANDIDATES ARE REQUIRED TO APPLY ONLINE ONLY. NO OTHER MODE IS ALLOWED FOR SUBMISSION OF APPLICATION. GOVERNMENT STRIVES TO HAVE A WORKFORCE WHICH REFLECTSS GENDER BALANCE AND WOMEN CANDIDATES ARE ENCOURAGED TO APPLY.

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No. 13/3/2024-E. I(B) : The Union Public Service Commission will hold a Screening Test for selection to Indian Forest Service (Main) Examination, 2025 through Civil Services (Preliminary) Examination, 2025 which will be held on 25th May, 2025, in accordance with the Rules published by the Ministry of Environment, Forests and Climate Change in the Gazette of India dated the 22nd January, 2025.

(A) The Preliminary Examination will be held at the following Centers:

Sl. No.	CENTRES	Sl. No.	CENTRES	Sl. No.	CENTRES
1.	AGARTALA	28.	GORAKHPUR	55.	PANAJI (GOA)
2.	AGRA	29.	GURGAON	56.	PATNA
3.	AHMEDABAD	30.	GWALIOR	57.	PORTBLAIR
4.	AIZAWL	31.	HYDERABAD	58.	PRAYAGRAJ (ALLAHABAD)
5.	AJMER	32.	IMPHAL	59.	PUDUCHERRY
6.	ALIGARH	33.	INDORE	60.	PUNE
7.	ALMORA(UTTARAKHAND)	34.	ITANAGAR	61.	RAIPUR
8.	ANANTHAPURU	35.	JABALPUR	62.	RAJKOT
9.	BAREILLY	36.	JAIPUR	63.	RANCHI
10.	BENGALURU	37.	JAMMU	64.	SAMBALPUR
11.	BHOPAL	38.	JODHPUR	65.	SHILLONG
12.	BILASPUR (C.G.)	39.	JORHAT	66.	SHIMLA
13.	CHANDIGARH	40.	KARGIL	67.	SILIGURI
14.	CHENNAI	41.	KOCHI	68.	SRINAGAR
15.	CHHATRAPATI SAMBHAJINAGAR [AURANGABAD (MAH)]	42.	KOHIMA	69.	SRINAGAR(UTTARAKHAND)
16.	COIMBATORE	43.	KOLKATTA	70.	SURAT
17.	CUTTACK	44.	KOZHIKODE (CALICUT)	71.	THANE
18.	DEHRADUN	45.	LEH	72.	THIRUVANANTHAPURAM
19.	DELHI	46.	LUCKNOW	73.	TIRUCHIRAPALLI
20.	DHARAMSHALA (HP)	47.	LUDHIANA	74.	TIRUPATI
21.	DHARWAR	48.	MADURAI	75.	UDAIPUR
22.	DISPUR	49.	MANDI (HP)	76.	VARANASI
23.	FARIDABAD	50.	MUMBAI	77.	VELLORE
24.	GANGTOK	51.	MYSURU	78.	VIJAYAWADA
25.	GAUTAM BUDDH NAGAR	52.	NAGPUR	79.	VISHAKHAPATNAM
26.	GAYA	53.	NASIK	80.	WARANGAL
27.	GHAZIABAD	54.	NAVI MUMBAI		

(A) The Main Examination will be held at the following Centers:

Sl. No.	CENTRES	Sl. No.	CENTRES	Sl. No.	CENTRES
1.	BHOPAL	5.	HYDERABAD	9.	PORT BLAIR
2.	CHENNAI	6.	KOLKATA	10.	SHIMLA
3.	DELHI	7.	LUCKNOW		
4.	DISPUR (GUWAHATI)	8.	NAGPUR		

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The centres and the date of holding the examination as mentioned above are liable to be changed at the discretion of the Commission. Applicants should note that there will be a ceiling on the number of candidates allotted to each of the Centres, except Chennai, Dispur, Kolkatta and Nagpur. Allotment of Centres will be on the "**first-apply-first allot**" basis, and once the capacity of a particular Centre is attained, the same will be frozen. Applicants, who cannot get a Centre of their choice due to ceiling, will be required to choose a Centre from the remaining ones. Applicants are, thus, advised that they may apply early so that they could get a Centre of their choice.

NB: Notwithstanding the aforesaid provision, Commission reserves the right to change the Centres at their discretion if the situation demands.

All the Examination Centres for CS(P) 2025 Examination will cater to examination for Low Vision Candidates in their respective centres. Candidates admitted to the examination will be informed of the time table and place or places of examination.

The candidates should note that no request for change of centre will be entertained.

(B) PLAN OF EXAMINATION

The Indian Forest Service Examination will consist of two successive stages (**vide Appendix I Section-I below**).

(i) Civil Services (Preliminary) Examination (Objective type) for the selection of candidates for the Indian Forest Service (Main) Examination; and

(ii) Indian Forest Service (Main) Examination (Written and Interview) for the selection of candidates for the Indian Forest Service.

B.1 A candidate who is willing to apply for Indian Forest Service Examination shall be required to apply on-line and submit the requisite information and supporting documents towards various claims, such as date of birth, category [viz. SC/ST/OBC/EWS/PwBD/Ex-Servicemen], educational qualification etc. as may be sought by the Commission alongwith the Online Application Form. The failure to provide the required information/documents along with Registration and Online Application Form will entail cancellation of candidature for the examination.

B.2 The Commission shall provide a window of 10 (Ten) days after the declaration of result of Indian Forest Service (Preliminary) Examination for taking cadre preference from the qualified candidates. All the qualified candidates will mandatorily fill the cadre preference along with the fee of Rs. 200 for admission into the Indian Forest Service (Main) Examination.

B.3 The Commission shall also provide a window of 15 (Fifteen) days from the date of declaration of result of written part of Indian Forest Service (Main) Examination to the candidates qualified for Personality Test/Interview. The candidates as per Note I below Rule 7 of IFSE, 2025 shall be required to update their details/educational qualification status (whether appearing/appeared) and to produce/upload the proof of passing of the requisite qualifying examination at the specified module/portal, failing which such candidates will not be allowed to appear in the Personality Test/Interview and his/her candidature will be liable to be cancelled.

Note: In this period, all the candidates qualified for Personality Test shall also be provided an option to update Correspondence/ Permanent Postal Address, Higher Educational Qualification, Achievement in different fields (if any), Employment Details/Service Experience, details of the Service allocated on the basis of earlier/previous Indian Forest Service Examinations (if any) and Cadre Preferences for the current examination. The details updated in this window will be treated as

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final and no request for any change in these fields received through any other mode will be entertained.

B.4 (i) A candidate shall be required to indicate, as and when asked for by the Commission, and in the manner prescribed by it, his/her choice in the order of preference from amongst the various State Cadres including his/her 'Home State'.

(ii) The cadre allotment to candidates appointed to Indian Forest Service will be governed by the policy of cadre allotment in force at the time of allotment of cadre. Due consideration will be given at the time of making allocation on the results of the examination to the preferences expressed by a candidate for various cadres.

(iii) **No change in preference for Cadre once submitted by a candidate would be permitted except as provided in Para B.3 above.**

2. The number of vacancies to be filled on the results of the examination is expected to be approximately **150**. The number of vacancies is liable to alteration. Reservation will be made for candidates belonging to Scheduled Castes, Scheduled Tribes, Other Backward Classes, Economically Weaker Section and Person with Benchmark Disability Categories in respect of vacancies as may be fixed by the Government.

Note: As per the information received from the Ministry of Environment, Forests and Climate Change, the following vacancies have been kept reserved for candidates belonging to PwBD Category. However the vacancies indicated are liable to further alteration.

Category	No. of vacancy(ies)	Backlog vacancy(ies)	Total
(a) Low Vision	02	00	02
(b) Hard of Hearing	02	01	03
(c) Locomotor Disability (Leprosy Cured and Acid Attack Victims)	02	02	04
Total	06	03	09

As per the policy notified by the Government for increasing the access of unemployed to job opportunities, the information of candidates who appeared in the final stage of Examination (Interview / Personality Test) but not recommended, will be made accessible to any registered Private Company, Public Sector Undertaking, Statuary and Autonomous organisations of Government of India on the dedicated portal on the website of the Commission to identify suitable candidates in line of their requirements for providing employment. Short biodata of the candidates with their educational qualifications, contact numbers, details including their percentile (not absolute or percentage marks), etc will also be made accessible on this dedicated portal. The data available on this portal shall be restricted for the purpose of evaluation of suitability of the candidates for employment purpose only to these registered organisations. These lists will be made available after the Reserve List is utilized/exhausted after declaration of final result. It may be noted that there is no option for partial disclosure and choice once opted cannot be changed.

Candidates will be required to give their consent at the time of Interview/Personality Test, while downloading the e-Summon Letter from the Commission's website for the interview. A candidate may opt out of the scheme also and in that case his/her details will not be published by the Commission.

Besides sharing of the information of the non-recommended willing candidates of this examination, the Commission will not assume any responsibility or liability for the method and manner in which information related to such candidates is utilized by these registered organizations.

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3. ELIGIBILITY CONDITIONS :

(i) NATIONALITY :

A candidate must be either :-

(a) A citizen of India, or

(b) a subject of Nepal, or

(c) a subject of Bhutan, or

(d) a Tibetan refugee who came over to India before 1st January, 1962 with the intention of permanently settling in India, or

(e) a person of Indian origin who has migrated from Pakistan, Burma, Srilanka, East African countries of Kenya, Uganda, the United Republic of Tanzania, Zambia, Malawi, Zaire, Ethiopia and Vietnam with the intention of permanently settling in India.

Provided that a candidate belonging to categories (b), (c), (d) and (e) shall be a person in whose favour a certificate of eligibility has been issued by the Government of India.

A candidate in whose case a certificate of eligibility is necessary, may be admitted to the examination but the offer of appointment may be given only after the necessary eligibility certificate has been issued to him/her by the Government of India.

(ii) AGE LIMITS :

(a) A candidate must have attained the age of 21 years and must not have attained the age of 32 years on **1st August, 2025**, i.e. he must have been born not earlier than **2nd August, 1993** and not later than **1st August, 2004**.

(b) The upper age limit prescribed above will be relaxable:-

(i) upto a maximum of five years if a candidate belongs to a Scheduled Caste or a Scheduled Tribe.

(ii) upto a maximum of three years in the case of candidates belonging to Other Backward Classes who are eligible to avail of reservation applicable to such candidates.

(iii) upto a maximum of three years in the case of Defence Services personnel disabled in operations during hostilities with any foreign country or in a disturbed area and released as a consequence thereof:

(iv) upto a maximum of five years in the case of ex-servicemen including Commissioned Officers and ECOs/SSCOs who have rendered at least five years Military Service as on 1st August, 2025 and have been released;

(i) on completion of assignment (including those whose assignment is due to be completed within one year from 1st August, 2025) otherwise than by way of dismissal or discharge on account of misconduct or inefficiency, or

(ii) on account of physical disability attributable to Military Service, or

(iii) on invalidment.

(v) upto a maximum of five years in the case of ECOs/SSCOs who have completed an initial period of assignment of five years of Military Service as on 1st August, 2025 and whose assignment has been extended beyond five years and in whose case the Ministry of Defence issues a certificate that they can apply for civil employment and that they will be released on three month's notice on selection from the date of receipt of offer of appointment.

(vi) up to a maximum of 10 years in the case of Persons with Benchmark Disabilities viz. (a) low vision; (b) Partially deaf; (c) locomotor disability (Sub-category : leprosy cured and acid attack victims only).

NOTE I : Candidates belonging to the Scheduled Castes and the Scheduled Tribes and the Other Backward Classes who are also covered under any other clauses of para 3(ii)(b) above, viz. those coming under the category of Ex-servicemen, Low Vision, Hearing Impaired (Partially deaf) and Locomotor disability (sub-category : Leprosy cured and Acid attack victims) person etc. will be eligible for grant of cumulative age relaxation under both the categories.

NOTE II : In regard to Functional Classification and Physical Requirements of PwBD candidates, the same procedure as has been followed till the previous examination may be followed by the Government (Ministry of Environment, Forest and Climate Change).

NOTE III : The term Ex-servicemen will apply to the persons who are defined as ex-servicemen in the Ex-servicemen (Re-employment in Civil Services and Posts) rules, 1979 as amended from time to time.

NOTE IV : The age concession under para 3(ii)(b)(iv) and (v) will be admissible to Ex-Servicemen i.e. a person who has served in any rank whether as combatant or non-combatant

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in the Regular Army, Navy and Air Force of the Indian Union and who either has been retired or relieved or discharged from such service whether at his own request or being relieved by the employer after earning his or her pension.

NOTE V : Notwithstanding the provision of age relaxation under para 3(ii)(b)(vi) above a person with benchmark disability candidate will be considered to be eligible for appointment only if he/she (after such physical examination as the Government or appointing authority, as the case may be, may prescribe) is found to satisfy the requirements of physical and medical standards for the concerned Services/Posts to be allocated to the person with benchmark disability candidates by the Government.
SAVE AS PROVIDED ABOVE THE AGE LIMITS PRESCRIBED CAN IN NO CASE BE RELAXED.

NOTE VI : The date of birth accepted by the Commission is that entered in the Matriculation or Secondary School Leaving Certificate or in a certificate recognized by an Indian University as equivalent to Matriculation or in an extract from a Register of Matriculates maintained by a University, which extract must be certified by the proper authority of the University or in the Higher Secondary or an equivalent examination certificate.
These certificates are required to be submitted only at the time of applying for the Indian Forest Service (Main) Examination.
No other document relating to age like horoscopes, affidavits, birth extracts from Municipal Corporation, service records and the like will be accepted.
The expression Matriculation/Secondary Examination Certificate in this part of the instruction includes the alternative certificates mentioned above.

NOTE VII : Candidates should note that only the Date of Birth as recorded in the Matriculation/Secondary Examination Certificate or an equivalent certificate on the date of submission of applications will be accepted by the Commission and no subsequent request for its change will be considered or granted.

NOTE VIII : Candidates should also note that once a Date of Birth has been submitted by them in the application form and entered in the records of the Commission for the purpose of admission to an Examination, no change will be allowed subsequently (or at any other Examination of the Commission) on any grounds whatsoever.

(iii) MINIMUM EDUCATIONAL QUALIFICATIONS: A candidate must hold a Bachelor's degree with at least one of the subjects namely Animal Husbandry & Veterinary Science, Botany, Chemistry, Geology, Mathematics, Physics, Statistics and Zoology or a Bachelor's degree in Agriculture, Forestry or in Engineering of any of Universities incorporated by an Act of the Central or State Legislature in India or other educational institutions established by an Act of Parliament or declared to be deemed as a University under Section 3 of the University Grants Commission Act, 1956, or possess an equivalent qualification.

Note I : Candidates who have appeared at an examination the passing of which would render them educationally qualified for the Commission's examination but have not been informed of the results as also the candidates who intend to appear at such a qualifying examination will also be eligible for admission to the written part of Indian Forest Service Examination, 2025. However, all such candidates, who are declared qualified by the Commission for Interview/Personality Test, will be required to produce proof of passing of the requisite qualifying examination within the time limit prescribed in Rule 4.1 of IFSE, 2025. Only valid proof of passing the qualifying examination viz. Degree Certificate/Final Mark Sheet/Provisional Degree Certificate etc. as are normally issued to the candidate by the competent authority after the formal declaration of results by the University/Boards may be accepted.

NOTE II : In addition, the candidates who possess qualification equivalent to those specified in Rule 7 will be required to produce a certificate from University incorporated by an Act of the Central or State Legislature in India or other educational institutions established by an Act of the Parliament or declared to be deemed as a University under Section 3 of the University Grants Commission Act, 1956 clarifying that the degree is at par with the Bachelor degree specified in Rule 7 along with their application for the Main Examination failing which such candidate will not be admitted to the Main Examination.

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NOTE III : In exceptional cases the Union Public Service Commission may treat a candidate who has not any of the foregoing qualifications as a qualified candidate provided that he/she has passed examination conducted by the other Institutions, the standard of which in the opinion of the Commission justifies his/her admission to the examination.

(iv) NUMBER OF ATTEMPTS:

Every candidate appearing at the Examination, who is otherwise eligible, shall be permitted **six** attempts at the examination.

Provided that this restriction on the number of attempts will not apply in the case of Scheduled Caste and Scheduled Tribe candidates who are otherwise eligible.
Provided further that the number of attempts permissible to candidates belonging to Other Backward Classes who are otherwise eligible, shall be nine.

Provided further that a person with benchmark disability will get as many attempts as are available to other candidates who do not belong to person with benchmark disability of his or her community, subject to the condition that a person with benchmark disability belonging to the **General and EWS Category** shall be eligible for **nine** attempts.. The relaxation will be available to the persons with benchmark disability who are eligible to avail of reservation applicable to such candidates.

NOTE :
(i) An attempt at a Preliminary Examination shall be deemed to be an attempt at the Examination.
(ii) If a candidate actually appears in any one paper in the Preliminary Examination, as a candidate for the Indian Forest Service (Main) Examination, it will be deemed that the candidate has made an attempt at the Examination.
(iii) Notwithstanding the disqualification/cancellation of candidature, the fact of appearance of the candidate at the examination will count as an attempt.

(V) MEDICAL AND PHYSICAL STANDARDS:

Candidates must be physically fit according to physical standards for admission to Indian Forest Service Examination, 2025 as per regulations given in Appendix-III of the rules for the Indian Forest Service Examination, 2025 published in Gazette of India dated **22nd January, 2025**.

4. FEE

Candidates (excepting Female/SC/ST/PwBD candidates who are exempted from payment of fee) are required to pay a fee of Rs. **100/-** (Rupees One Hundred only) either by depositing the money in any Branch of SBI by cash, or by using net banking facility of any Bank or by using Visa/Master/RuPay Credit/Debit card/UPI Payment.

Applicants who opt for "Pay by Cash" mode should print the system generated Pay-in-slip during part II registration and deposit the fee at the counter of SBI Branch on the next working day only. "Pay by Cash" mode will be deactivated at 23:59 hours of **10.02.2025** i.e. one day before the closing date; however applicants who have generated their Pay-in-Slip before it is deactivated may pay at the counter of SBI Branch during banking hours on the closing date. Such applicants who are unable to pay by cash on the closing i.e. during banking hours at SBI Branch, for reasons whatsoever, even if holding valid pay-in-slip will have no other offline option but to opt for available online Debit/Credit Card or Internet Banking payment mode on the closing date i.e. till **18:00 hours of 11.02.2025.**

For the applicant in whose case payments details have not been received from the bank, they will be treated as fictitious payment cases and a list of all such applicants shall be made available on the Commission's website within two weeks after the last day of submission of Online Application. These applicants shall also be intimated through e-mail to submit copy of proof of their payment to the Commission at the address mentioned in the e-mail. The applicant shall be required to submit the proof within 10 days from the date of such communication either by hand or by speed post to the Commission. In case, no response is received from the applicant, their application shall be summarily rejected and no further correspondence shall be entertained in this regard.

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All female candidates and candidates belonging to Scheduled Castes/Scheduled Tribes/Person with benchmark disability categories are not required to pay any fee. No fee exemption is, however, available to OBC/EWS candidates and they are required to pay the full prescribed fee.

Persons with benchmark disability are exempted from the payment of fee provided they are otherwise eligible for appointment to the Services/Posts to be filled on the results of this examination on the basis of the standards of medical fitness for these Services/Posts (including any concessions specifically extended to the persons with benchmark disability). A person with benchmark disability claiming age relaxation/fee concession will be required by the Commission to submit along with his/her Registration and Online Application Form, a certified copy of the certificate of disability from a Government Hospital/ Medical Board in support of his/her claim for being persons with benchmark disability.

NOTE : Notwithstanding the aforesaid provision for age relaxation/fee exemption, a person with benchmark disability will be considered to be eligible for appointment only if he/she (after such physical examination as the Government or the appointing authority, as the case may be, may prescribe) is found to satisfy the requirements of physical and medical standards for the concerned Services/Posts to be allocated to persons with benchmark disability by the Government.

NOTE I : APPLICATIONS WITHOUT THE PRESCRIBED FEE (UNLESS REMISSION OF FEE IS CLAIMED) SHALL BE SUMMARILY REJECTED.
NOTE II : Fee once paid shall not be refunded under any circumstances nor can the fee be held in reserve for any other examination or selection.

NOTE III : If any candidate who took the Indian Forest Service Examination held in **2024** wishes to apply for admission to this examination, he/she must submit his/her application so as to each the Commission's Office by the prescribed date without waiting for the results or an offer of appointment.

Note IV: Candidates qualified for the Indian Forest Service (Main) Examination will be required to pay a further fee of Rs. 200/- (Rupees Two hundreds only) (Except exempted category i.e. SC/ST/PwBD/Women) through a window of 10 (Ten) days to be provided after declaration of Result of Indian Forest Service (Preliminary) Examination.

5. HOW TO APPLY:

(a) Candidates are required to apply Online using the link https://upsconline.gov.in **for Civil Services (Preliminary) Examination which will act as a screening mechanism for selection of candidates for the Indian Forest Service (Main) Examination. Candidates who wish to apply for Civil Services Examination also [subject to their satisfying the prescribed eligibility conditions], have to apply once by appropriately indicating in the Online Application Form that they intend to appear for both the Indian Forest Service Examination and the Civil Services Examination.**

(b) It is essential for the applicant to register himself/herself first at One Time Registration (OTR) (Registration) platform, available on the Commission's website, and then proceed for filling up the online application for the examination. OTR (Registration) has to be registered only once in life time. This can be done anytime throughout the year. If the candidate is already registered, he/she can proceed straightway for filling up the online application for the examination.

(c) Modification in OTR Profile (Registration):

In case, the candidate wants to effect any change in his/her OTR Profile (Registration), it shall be allowed only once in the lifetime after the registration. The change in OTR Profile (Registration) data shall be available till expiry of 7days from the next day after the closure of application window of his/her first final application for any Examination of the Commission. In the case, the candidate after registration of OTR applies for the first time in this examination last date of modification of OTR would be **18.02.2025**.

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(d) Modification in application form (Other than OTR Profile Registration):

The Commission has also decided to extend the facility of making correction(s) in any field(s) of the Online Application Form for this examination from next day of the closure of the application window of this Examination. This window will remain open for 07 days from the date of opening of the same, i.e., from **12.02.2025 to 18.02.2025**. In case a candidate wants to carry out any change in his/her OTR profile during this period, then he/she should log into the OTR (Registration) platform and do the needful accordingly. In other words, no change in the OTR Profile (Registration) can be made by visiting the window for Modification in application form.

(e) Withdrawal of Application: The candidates will not be allowed to withdraw their applications after submission of the same.

(f) Detailed instructions for filling up Online Applications are available on the above mentioned website.

(g) 'No' queries, representations etc. shall be entertained by the Commission in respect of correcting details that are required to be filled up by the candidates by exercising due diligence and caution as the timely completion of examination process is of paramount importance.

(h) All candidates, whether already in Government Service, or in Government owned industrial undertakings or other similar organizations or in private employment should submit their applications direct to the Commission.

Persons already in Government service, whether in a permanent or temporary capacity or as work charged employees other than casual or daily rated employees or those serving under Public Enterprises are however, required to inform their Head of Office/Department that they have applied for the Examination.

Candidates should note that in case a communication is received from their employer by the Commission withholding permission to the candidates applying for/appearing at the examination, their applications will be liable to be rejected/candidature will be liable to be cancelled.

NOTE 1: While filling in his/her Online Application Form, the candidate should carefully decide about his/her choice of centre for the Examination. If any candidate appears at a centre other than the one indicated by the Commission in his/her Admission Certificate, the papers of such a candidate will not be evaluated and his/her candidature will be liable to cancellation.

NOTE 2: The Persons with Benchmark Disabilities in the categories of blindness (partially blind), will be provided the facility of scribe, if desired by the person. In case of other category of Persons with Benchmark Disabilities as defined under section 2(r) of the RPWD Act, 2016, the facility of scribe will be allowed to such candidates on production of a certificate to the effect that the person concerned has physical limitation to write, and scribe is essential to write examination on behalf, from the Chief Medical Officer/Civil Surgeon/Medical Superintendent of a Government Health Care institution as per proforma at **Appendix – IV.**

Further, for persons with specified disabilities covered under the definition of Section 2(s) of the RPwD Act, 2016 but not covered under the definition of Section 2(r) of the said Act, i.e. persons having less than 40% disability and having difficulty in writing will be provided the facility of scribe subject to production of a certificate to the effect that person concerned has limitation to write and that scribe is essential to write examination on his/her behalf from the competent medical authority of a Government healthcare institution as per proforma at Appendix-VII.

The candidates have discretion of opting for his/her own scribe or request the Commission for the same. The details of scribe i.e. whether own or the Commission's and the details of scribe in case candidates are bringing their own scribe, will be sought at the time of filling up the application form online. Suitable provisions in Online Application have been made (for Candidates having 40% disability or more) and Appendix-VIII (for Candidates having less than 40% disability and having difficulty in writing).

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NOTE 3 : The qualification of the Commission's scribe as well as own scribe will not be more than the minimum qualification criteria of the examination. However, the qualification of the scribe should always be matriculate or above.

NOTE 4 : The Persons with Benchmark Disabilities in the category of low-vision will be allowed Compensatory Time of twenty minutes per hour of the examination. In case of other categories of Persons with Benchmark Disabilities, this facility will be provided on production of a certificate to the effect that the person concerned has physical limitation to write from the Chief Medical Officer/Civil Surgeon/Medical Superintendent of a Government Health Care institution as per proforma at **Appendix-IV**.

Further, for persons with specified disabilities covered under the definition of Section 2(s) of the RPwD Act, 2016 but not covered under the definition of Section 2(r) of the said Act, i.e. persons having less than 40% disability and having difficulty in writing will be provided compensatory time subject to production of a certificate to the effect that person concerned has limitation to write from the competent medical authority of a Government healthcare institution as per proforma at Appendix-VII.

NOTE 5 : Candidates applying for the Examination, 2025 will be required to indicate information such as (a) detail of centres for Civil Services (Main) Examination and Indian Forest Service (Main) Examination (b) Optional subject to be selected for both the examinations, (c) medium of examination for Civil Services (Main) Examination and (d) compulsory Indian language for Civil Services (Main) Examination at the time of the filling up online application form itself, incase he/she is applying for both the Civil Services Examination and the Indian Forest Service Examination or else requisite examination specific information, as the case may be.

NOTE 6: The candidates applying for the examination should ensure that they fulfill all the eligibility conditions for admission to the Examination. Their admission at all the stages of examination for which they are admitted by the Commission viz. Preliminary Examination, Main (Written) Examination and Personality Test (Interview) will be purely provisional, subject to their satisfying the prescribed eligibility conditions. If on verification at any time before or after the Preliminary Examination, Main (written) Examination and Personality Test (Interview), it is found that they do not fulfill any of the eligibility conditions; their candidature for the examination will be cancelled by the Commission. The decision of the Commission as to the eligibility or otherwise of a candidate for admission to the Examination shall be final.

If any of their claims is found to be incorrect, they may render themselves liable to disciplinary action by the Commission in terms of Rule 12 of the Rules for the Indian Forest Service Examination, 2025 reproduced below :

(1) A candidate who is or has been declared by the Commission to be guilty of :-

(a) Obtaining support for candidature by the following means, namely :-
  (i) offering illegal gratification to; or
  (ii) applying pressure on; or
  (iii) blackmailing, or threatening to blackmail any person connected with the conduct of the examination; or

(b) impersonation; or

(c) procuring impersonation by any person; or

(d) submitting fabricated/incorrect documents or documents which have been tampered with; or

(e) uploading irrelevant or incorrect photo/signature in the application form in place of actual photo/signature; or

(f) making statements which are incorrect or false or suppressing material information; or

(g) resorting to the following means in connection with the candidature for the examination, namely :-
  (i) obtaining copy of question paper through improper means; or
  (ii) finding out the particulars of the persons connected with secret work relating to the examination; or
  (iii) influencing the examiners; or

(h) being in possession of or using unfair means during the examination; or

(i) writing obscene matter or drawing obscene sketches or irrelevant matter in the scripts; or

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(j) misbehaving in the examination hall including tearing of the scripts, provoking fellow examinees to boycott examination, creating a disorderly scene and the like; or

(k) harassing, threatening or doing bodily harm to the staff employed by the Commission for the conduct of the examination; or

(l) being in possession of or using any mobile phone, (even in switched-off mode), pager or any electronic equipment or programmable device or storage media like pen drive, smart watches etc. or camera or bluetooth devices or any other equipment or related accessories (either in working or switched-off mode) capable of being used as a communication device during the examination; or

(m) violating any of the instructions issued to candidates along with their admission certificates permitting them to take the examination; or

(n) attempting to commit or, as the case may be, abetting the commission of all or any of the acts specified in the foregoing clauses;

in addition to being liable to criminal prosecution, shall be disqualified by the Commission from the Examination held under these Rules; and/or shall be liable to be debarred either permanently or for a specified period :-

(i) by the Commission, from any examination or selection held by them;

(ii) by the Central Government from any employment under them;

and shall be liable to face disciplinary action under the appropriate rules if already in service under Government;

Provided that no penalty under this rule shall be imposed except after :-

(i) giving the candidate an opportunity of making such representation in writing as the candidate may wish to make in that behalf; and

(ii) taking the representation, if any, submitted by the candidate within the period allowed for this purpose, into consideration.

(2) Any person who is found by the Commission to be guilty of colluding with a candidate(s) in committing or abetting the commission of any of the misdeeds listed at the clauses (a) to (m) above will be liable to action in terms of the clause (n) above.

Note: "If a candidate is found to be in possession or using unfair means, may not be allowed to continue in the said exam as soon as the incident comes to notice of the Examination functionaries and the action against the candidates may be taken in consultation with the Commission. Further, the candidate may also not to be allowed in any of the subsequent papers of the said examination."

6. LAST DATE FOR SUBMISSION OF APPLICATIONS:

The Online Applications can be filled upto **11th February, 2025 till 18:00 Hours,** after which the link will be disabled. Detailed instructions regarding filling of online application is available at Appendix-II.

7. CORRESPONDENCE WITH THE COMMISSION:

The Commission will not enter into any correspondence with the candidates about their candidature except in the following cases:

(i) The eligible candidates shall be issued an e-Admit Card on the last working day of preceding week of the date of the Examination. The e-Admit Card will be made available in the UPSC website [**https://upsconline.gov.in**] for downloading by candidates. No Admission Certificate will be sent by post. If a candidate does not receive his/her e-Admit Card or any other communication regarding his/her candidature for the examination three days before the date of the Examination, he/she should at once contact the Commission. Information in this regard can also be obtained from the Facilitation Counter located in the Commission's office either in person or over phone Nos.011-23381125/011-23385271/011-23098543.

In case no communication is received in the Commission's office from the candidate regarding non-receipt of his/her e-Admit Card at least three days before the commencement of the examination, he/she himself/ herself will be solely responsible for non-receipt of his/her e-Admission Certificate.

No candidate will ordinarily be allowed to take the examination unless he/she holds an e-certificate of admission for the examination. On receipt of e-Admit Card, candidates should check it carefully and bring discrepancies/errors, if any, to the notice of UPSC immediately.

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The candidates should note that their admission to the examination will be purely provisional based on the information given by them in the Application Form. This will be subject to verification of all the eligibility conditions by the UPSC.

The mere fact that a certificate of admission to the Examination has been issued to a candidate, will not imply that his/her candidature has been finally cleared by the Commission or that entries made by the candidate in his/her Registration and Online application Form for the Indian Forest Service Examination have been accepted by the Commission as true and correct. Candidates may note that the Commission takes up the verification of eligibility conditions of a candidate, with reference to original documents, only after the candidate has qualified for Indian Forest Service (Main) Examination. Unless candidature is formally confirmed by the Commission, it continues to be provisional.

The decision of the Commission as to the eligibility or otherwise of a candidate for admission to the Examination shall be final. Candidates should note that the name in the e-Admit Card in some cases may be abbreviated due to technical reasons.

(ii) In the event of a candidate downloading more than one e-Admit Card from the website of the Commission, he/she should use only one of these e-Admit Cards for appearing in the examination and report about the other(s) to the Commission Office.

(iii) Candidates are informed that as the Preliminary Examination is only a screening test, no marks sheets will be supplied to successful or unsuccessful candidates and no correspondence will be entertained by the Commission, in this regard.

(iv) Candidates must ensure that their E-mail IDs given in their online Applications are valid and active as the Commission may use electronic mode of communication while contacting them at different stages of the examination process.

IMPORTANT : *ALL COMMUNICATIONS TO THE COMMISSION SHOULD INVARIABLY CONTAIN THE FOLLOWING PARTICULARS.*

1. NAME AND YEAR OF THE EXAMINATION
2. REGISTRATION I.D. (RID)
3. ROLL NUMBER (IF RECEIVED)
4. NAME OF CANDIDATE (IN FULL AND IN BLOCK LETTERS)
5. COMPLETE POSTAL ADDRESS AS GIVEN IN THE APPLICATION.
6. VALID AND ACTIVE E-MAIL I.D.

N.B.I: *COMMUNICATION NOT CONTAINING THE ABOVE PARTICULARS MAY NOT BE ATTENDED TO.*

N.B.II : *IF A LETTER/COMMUNICATION IS RECEIVED FROM A CANDIDATE AFTER AN EXAMINATION HAS BEEN HELD AND IT DOES NOT GIVE HIS/HER FULL NAME AND ROLL NUMBER, IT WILL BE IGNORED AND NO ACTION WILL BE TAKEN THEREON.*

N.B.III : *CANDIDATES ARE STRONGLY ADVISED TO KEEP A PRINTOUT OR SOFT COPY OF THEIR ONLINE APPLICATION FOR FUTURE REFERENCES.*

8. Reservation against vacancies for Persons with Benchmark Disability:

The eligibility for availing reservation against the vacancies reserved for the persons with benchmark disability shall be the same as prescribed in "The Rights of Persons with Disabilities Act, 2016 (RPwD Act, 2016)": **Reservation in vacancies for Indian Forest Service is granted only to (a) Low vision; (b) Hearing Impaired (Partially deaf); and (c) Locomotor Disability (Sub-category : Leprosy Cured and Acid Attack Victims only).**

Provided further that the candidates from Persons with Benchmark Disability category shall also be required to meet special eligibility criteria in terms of physical requirements/ functional classification (abilities/disabilities) consistent with requirements of the identified service/post as may be prescribed by its cadre controlling authority.

The Functional Classifications and Physical Requirements for Persons with Benchmark Disability suitable and identified for Indian Forest Service Examination is as under:-

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Category(ies) for which Identified	Functional Classification	Physical Requirements
(i) Locomotor Disability (Sub-category : Leprosy Cured and Acid Attack Victims only)	Leprosy Cured, Acid Attack Victims	S, ST, W, SE, H, RW, C
(ii) Low Vision	LV	MF, PP, S, ST, W, L,C, RW, H, KC, BN
(iii)Hearing Impaired (Partially Deaf)	PD, HH	PP, S, ST, W, L, C, RW, KC, BN

Note : The above list is subject to revision from time to time.

9. ELIBIBILITY FOR AVAILING RESERVATION:

(1) A candidate will be eligible to get the benefit of community reservation only in case the particular caste to which the candidates belong is included in the list of reserved communities issued by the Central Government.

(2) The OBC candidates applying for IFS Exam, 2025 through CSE-2025 must produce OBC (Non-Creamy Layer) certificate based on the income for the Financial Year (FY) 2023-24, 2022-23 and 2021-22 and issued on/after 01.04.2024 (after completion of FY 2023-24) but not later than the closing date of the application for Indian Forest Service (Preliminary) Examination, 2024 through Civil Services (Preliminary) Examination, 2025 i.e. 11th February, 2025.

(3) A candidate will be eligible to get the benefit of the Economically Weaker Section reservation only in case the candidate meets the criteria issued by the Central Government and is in possession of requisite Income & Asset Certificate based on the income for Financial Year (FY) 2023-24 and issued on/after 01.04.2024 (after completion of FY 2023-24) but not later than the closing date of the application for Indian Forest Service (Preliminary) Examination, 2025 through Civil Services (Preliminary) Examination, 2025 i.e. 11th February, 2025.

10. Candidates seeking reservation/relaxation benefits available for SC/ST/OBC/EWS/ PwBD/Ex-servicemen must ensure that they are entitled to such reservation/relaxation as per eligibility prescribed in the Rules/Notice. They should also be in possession of all the requisite certificates in the prescribed format in support of their claim as stipulated in the Rules/Notice for such benefits by the closing date of the application of Indian Forest Service (Preliminary) Examination, 2025 through Civil Services (Preliminary) Examination, 2025.

The closing date fixed for the receipt of the Online application Form of Indian Forest Service (Preliminary) Examination, 2025 through Civil Services (Preliminary) Examination, 2025 will be treated as the date for determining the OBC status (including that of creamy layer) of the candidates.

11. CHANGE OF CATEGORY:

If a candidate indicates in his/her Registration and Online Application form for Indian Forest Service Examination through Civil Services (Preliminary) Examination that he/she belongs to General category but subsequently writes to the Commission to change his/her category to a reserved one, such request shall not be entertained by the Commission. Further, once a candidate has chosen a reserved category, no request shall be entertained for change to other reserved category viz. SC to ST, ST to SC, OBC to SC/ST or SC/ST to OBC, SC to EWS, EWS to SC, ST to EWS, EWS to ST, OBC to EWS, EWS to OBC. No reserved category candidates other than those who qualified each stage of the Examination on General Merit, shall be allowed to change (on their request or as decided by the Commission/Government based on the documents submitted by them) their category from Reserved to Unreserved or claim the vacancies (Cadre) for unreserved category after the declaration of final result by UPSC. In case where such candidates do not qualify on General Standard, their candidature shall be cancelled.

Further no Persons with Benchmark Disabilities (PwBD) candidate of any subcategory thereunder shall be allowed to change his/her sub-category of disability. While the above principle will be followed in general, there may be a few cases where there was a gap not more than 3 months between the issuance of a Government Notification enlisting a particular community in the list of any of the reserved communities and the date of submission of the

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application by the candidate. In such cases the request of change of community from General to Reserved may be considered by the Commission on merit.

In case of a candidate unfortunately becoming person with benchmark disability during the course of the examination process, the candidate should produce valid documents showing him/her acquiring a disability to the extent of 40% or more as defined under the RPwD Act, 2016 to enable him/her to get the benefits of reservation earmarked for persons with benchmark disability provided he/she otherwise remains eligible for Indian Forest Service as per Rule 19 of Indian Forest Service Examination.

12. Details about the scheme of examination, standard and syllabi of the subjects etc. may be seen in Appendix-I of this Notice.

(Satender Kumar Gupta)
JOINT SECRETARY
UNION PUBLIC SERVICE COMMISSION

APPENDIX I
SECTION I
PLAN OF EXAMINATION

The competitive examination comprises two successive stages :

(i) Civil Services (Preliminary) Examination (Objective Type) for the screening & selection of candidates for Indian Forest Service (Main) Examination; and

(ii) Indian Forest Service (Main) Examination (Written and Interview) for the selection of candidates against the vacancies identified and reported for the Indian Forest Service Examination.

2. The preliminary Examination will consist of two papers of Objective type (multiple choice questions) and carry a maximum of 400 marks in the subjects set out in sub-section (A) of Section II. This examination is meant to serve as a screening test only; the marks obtained in the Preliminary Examination by the candidates who are declared qualified for admission to the Main Examination will not be counted for determining their final order of merit. The number of candidates to be admitted to the Main Examination will be about twelve to thirteen times the total approximate number of vacancies to be filled in the year through this examination. Only those candidates who are declared by the Commission to have qualified in the Preliminary Examination in the year will be eligible for admission to the Main Examination of that year provided they are otherwise eligible for admission, to the Main Examination.

Note I : Since there may be common candidates for Civil Services Examination and the Indian Forest Service Examination, after the common Screening Test done through Civil Services (Preliminary) Examination, separate lists will be prepared for the candidates eligible to appear in the Civil Service (Main) Examination and Indian Forest Service (Main) Examination, based on the criterion of minimum qualifying marks of 33% in General Studies Paper-II of Civil Services (Preliminary) Examination **and total qualifying marks of General Studies Paper-I of Civil Services (Preliminary) Examination** as determined by the Commission on the number of vacancies to be filled through the Civil Services Examination and Indian Forest Service Examination.

Note II : There will be negative marking for incorrect answers as detailed below :-

(i) There are four alternatives for the answers to every question. For each question for which a wrong answer has been given by the candidate, one-third of the marks assigned to that question will be deducted as penalty.

(ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happen to be correct and there will be same penalty as above for that question.

(iii) If a question is left blank i.e. no answer is given by the candidate, there will be no penalty for that question."

3. The Main Examination will consist of written examination and an interview test. The written examination will consist of 6 papers of conventional essay type in the subjects set out in sub-section (B) of Section II. Also see Note (ii) under para I of Section II(B).

4. Candidates who obtain such minimum qualifying marks in the written part of the Main Examination as may be fixed by the Commission at their discretion, shall be summoned by them for an interview for a Personality Test vide sub-section 'C' of Section II. The number of candidates to be summoned for interview will be about twice the number of vacancies to be filled.

The interview will carry **300 marks** (with no minimum qualifying marks).

Marks thus obtained by the candidates in the Main Examination (written part as well as interview) would determine their final ranking.

SECTION II

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Scheme and subjects for the Preliminary and Main Examination.

A. PRELIMINARY EXAMINATION :

The Examination shall comprise of two compulsory Papers of 200 marks each.

Note :

(i) Both the question papers will be of the objective type (multiple choice questions).

(ii) The General Studies Paper-II of the Civil Services (Preliminary) Examination will be a qualifying paper with minimum qualifying marks fixed at 33%.

(iii) The question papers will be set both in Hindi and English.

(iv) Details of the syllabi are indicated in Part A of Section III.

B. MAIN EXAMINATION:

(A) The written examination consisting of the following papers:—

Paper I—General English	300 Marks
Paper II—General Knowledge	300 Marks

Papers III, IV, V and VI.—Any two subjects to be selected from the list of the optional subjects set out in para 2 below. Each subject will have two papers — 200 marks for each paper.

Note : Answer scripts of only those candidates who have obtained the minimum marks as decided by the Commission for Paper II (General Knowledge) will be evaluated.

(B) Interview for Personality Test (See Part C of Section II of this Appendix) of such candidates as may be called by the Commission— Maximum Marks : 300

2. List of optional subjects :

(i) Agriculture
(ii) Agricultural Engineering
(iii) Animal Husbandry & Veterinary Science
(iv) Botany
(v) Chemistry
(vi) Chemical Engineering
(vii) Civil Engineering
(viii) Forestry
(ix) Geology
(x) Mathematics
(xi) Mechanical Engineering
(xii) Physics
(xiii) Statistics
(xiv) Zoology

Provided that the candidates will not be allowed to offer the following combination of subjects :

(a) Agriculture and Agricultural Engg.
(b) Agriculture and Animal Husbandry & Veterinary Science.
(c) Agriculture and Forestry.
(d) Chemistry and Chemical Engg.
(e) Mathematics and Statistics.
(f) Of the Engineering subjects viz. Agricultural Engineering, Chemical Engineering, Civil Engineering and Mechanical Engineering—not more than one subject;

NOTE—The standard and syllabi of the subjects mentioned above are given in Section III.

General Instructions (Main Examination) :

1. All the question papers for the examination will be of conventional (essay) type.
2. ALL QUESTION PAPERS MUST BE ANSWERED IN ENGLISH. QUESTION PAPERS WILL BE SET IN ENGLISH ONLY.
3. The duration of each of the papers referred to above will be three hours.
4. The Commission have discretion to fix qualifying marks in any or all the papers of the examination.
5. If a candidate's handwriting is not easily legible, deduction will be made on this account from the total marks otherwise accruing to him/her.
6. Marks will not be allotted for mere superficial knowledge.
7. Credit will be given for orderly, effective and exact expression combined with due economy of words in all subjects of the examination.
8. In the question papers, wherever required, SI units will be used.
9. Candidates should use only international form of Indian numerals (e.g. 1, 2, 3, 4, 5, 6, etc.) while answering question papers.
10. Candidates will be allowed the use of Scientific (Non-programmable type) calculators at the conventional type examinations of UPSC. Programmable type calculators will however not be allowed and the use of such calculators shall tantamount to resorting to unfair means by the candidates. Loaning and interchanging of calculators in the Examination Hall is not permitted. It is also important to note that

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candidates are not permitted to use calculators for answering objective type papers (Test Booklets). They should not therefore bring the same inside the Examination Hall.

11. Candidates should note that if any irrelevant matter/signages/marks etc. are found written in the answer script(s), which would not be related to any question/answer and/or would be having the potential to disclose the candidate's identity, the Commission will impose a penalty of deduction of marks from the total marks otherwise accruing to the candidate or will not evaluate the said script(s) on this account.

12(i). Candidates must write the papers in their own hand. In no circumstances will they be allowed the help of a scribe to write the answers for them. The Persons with Benchmark Disabilities in the category of low vision, will be provided the facility of scribe, if desired by the person. In case of other category of Persons with Benchmark Disabilities as defined under section 2(r) of the RPWD Act, 2016, the facility of scribe will be allowed to such candidates on production of a certificate to the effect that the person concerned has physical limitation to write, and scribe is essential to write examination on behalf, from the Chief Medical Officer/Civil Surgeon/Medical Superintendent of a Government Health Care institution as per proforma at **Appendix – IV.**

Further, for persons with specified disabilities covered under the definition of Section 2(s) of the RPwD Act, 2016 but not covered under the definition of Section 2(r) of the said Act, i.e. persons having less than 40% disability and having difficulty in writing will be provided the facility of scribe subject to production of a certificate to the effect that person concerned has limitation to write and that scribe is essential to write examination on his/her behalf from the competent medical authority of a Government healthcare institution as per proforma at Appendix-VI.

(ii) The candidates have discretion of opting for his/her own scribe or request the Commission for the same. The details of scribe i.e. whether own or the Commission's and the details of scribe in case candidates are bringing their own scribe, will be sought at the time of filling up the application form online. (for Candidates having 40% disability or more) and Appendix-VII (for Candidates having less than 40% disability and having difficulty in writing).

(iii) The qualification of the Commission's scribe as well as own scribe will not be more than the minimum qualification criteria of the examination. However, the qualification of the scribe should always be matriculate or above.

(iv) The Persons with Benchmark Disabilities in the category of low-vision will be allowed Compensatory Time of twenty minutes per hour of the examination. In case of other categories of Persons with Benchmark Disabilities, this facility will be provided on production of a certificate to the effect that the person concerned has physical limitation to write from the Chief Medical Officer/Civil Surgeon/Medical Superintendent of a Government Health Care institution as per proforma at **Appendix-IV**.

Further, for persons with specified disabilities covered under the definition of Section 2(s) of the RPwD Act, 2016 but not covered under the definition of Section 2(r) of the said Act, i.e. persons having less than 40% disability and having difficulty in writing will be provided compensatory time subject to production of a certificate to the effect that person concerned has limitation to write from the competent medical authority of a Government healthcare institution as per proforma at Appendix-VI.

Note (1) : The eligibility conditions of a scribe, his/her conduct inside the examination hall and the manner in which and extent to which he/she can help the **Persons with or without Benchmark Disability and having difficulty** in writing the **Indian Forest Service Examination** shall be governed by the instructions issued by the UPSC in this regard. Violation of all or any of the said instructions shall entail the cancellation of the candidature of the candidate in addition to any other action that the UPSC may take against the scribe.

The candidates who claim the facility of Scribe and/or Compensatory time must ensure that they fulfill all the requisite criteria essential for these facilities. If at any stage of examination/post recommendation, it is found that candidates do not fulfill requisite criteria, his/her candidature/appointment will be liable to cancelled and he/she will also be liable to be penalized under Rule 12 for making incorrect/false statements and/or for using unfair means. Further, as per Appendix-VII for the candidates covered under Section 2(s) of the RPwD Act, 2016, Compensatory time will be made available only if such candidates utilize the facility of scribe.

Note (2) : For purpose of these rules the candidate shall be deemed to be a **Low Vision** candidate if the percentage of visual impairment is Forty per cent (40%) or more. The criteria for determining the percentage of visual impairment shall be as follows :—

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Better eye Best Corrected	Worse eye Best Corrected	Per Cent Impairment	Disability category
6/6 to 6/18	6/6 to 6/18	0%	0
	6/24 to 6/60	10%	0
	Less than 6/60 to 3/60	20%	I
	Less than 3/60 to No Light Perception	30%	II (One eyed person)
6/24 to 6/60 Or Visual field less than 40 up to 20 degree around centre of fixation or heminaopia involving macula	6/24 to 6/60	40%	III a (low vision)
	Less than 6/60 to 3/60	50%	III b (low vision)
	Less than 3/60 to No Light Perception	60%	III c (low vision)
Less than 6/60 to 3/60 Or Visual field less than 20 up to 10 degree around centre of fixation	Less than 6/60 to 3/60	70%	III d (low vision)
	Less than 3/60 to No Light Perception	80%	III e (low vision)
Less than 3/60 to 1/60 Or Visual field less than 10 degree around centre of fixation	Less than 3/60 to No Light Perception	90%	IV a (Blindness)
Only HMCF Only Light Perception No Light Perception	Only HMCF Only Light Perception No Light Perception	100%	IV b (Blindness)

Note (3) : For availing of the concession admissible to a **Low Vision** candidate, the candidate concerned shall produce a certificate in the prescribed proforma from a Medical Board constituted by the Central/State Governments along with their application for the Main Examination.

Note (4) : The concession admissible to Low Vision candidates shall not be admissible to those suffering from Myopia.

(C) PERSONALITY TEST

The candidate will be interviewed by a Board of competent and unbiased observers who will have before them a record of his/her career. The object of the Interview is to assess the personal suitability of the candidate for the Service. The candidate will be expected to have taken an intelligent interest not only in his/her subjects of academic study but also in events which are happening around him/her both within and outside his/her own state or country, as well as in modem currents of thoughts and in new discoveries which should rouse the curiosity of well educated youth.

2. The technique of the interview is not that of a strict cross examination, but of a natural, though directed and purposive conversation, intended to reveal mental qualities of the candidate. The Board will pay special attention to assessing the intellectual curiosity, critical powers of observation and assimilation, balance of judgment and alertness of mind, initiative, tact, capacity for leadership; the ability for social cohesion, mental and physical energy and powers of practical application; integrity of character; and other qualities such as topographical sense, love for out-door life and the desire to explore unknown and out of way places.

SECTION III
SYLLABI FOR THE EXAMINATION

NOTE : Candidates are advised to go through the Syllabus published in this Section for the Preliminary Examination and the Main Examination.

Part A-Preliminary Examination

Paper I - (200 marks) Duration : Two hours

- Current events of national and international importance
- History of India and Indian National Movement
- Indian and World Geography- Physical, Social, Economic Geography of India and the World.
- Indian Polity and Governance- Constitution, Political System, Panchayati Raj, Public Policy, Rights Issues, etc.
- Economic and Social Development- Sustainable Development, Poverty, Inclusion, Demographics, Social Sector Initiatives, etc.
- General issues on Environmental ecology, Bio-diversity and Climate Change - that do not require subject specialization.
- General Science.

Paper II- (200 marks) Duration: Two hours

- Comprehension
- Interpersonal skills including communication skills;
- Logical reasoning and analytical ability

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- Decision making and problem solving
- General mental ability
- Basic numeracy (numbers and their relations, orders of magnitude, etc.) (Class X level), Data interpretation (charts, graphs, tables, data sufficiency etc. - Class X level)

Note 1: Paper-II of the Civil Services (Preliminary) Examination will be a qualifying paper with minimum qualifying marks fixed at 33%.

Note 2 : The questions will be of multiple choice, objective type.

Note 3: It is mandatory for the candidate to appear in both the Papers of Civil Services (Prelim) Examination for the purpose of evaluation. Therefore a candidate will be disqualified in case he/she does not appear in both the papers of Civil Services (Prelim) Examination.

Part B-Main Examination

The standard of papers in General English and General Knowledge will be such as may be expected of a Science or Engineering graduate of an Indian University.

THE SCOPE OF THE SYLLABUS FOR OPTIONAL SUBJECT PAPERS FOR THE EXAMINATION IS BROADLY OF THE HONOURS DEGREE LEVEL I.E. A LEVEL HIGHER THAN THE BACHELORS DEGREE AND LOWER THAN THE MASTERS DEGREE. IN THE CASE OF ENGINEERING SUBJECTS, THE LEVEL CORRESPONDS TO THE BACHELORS DEGREE.

There will be no practical examination in any of the subjects.

GENERAL ENGLISH

Candidates will be required to write an essay in English. Other questions will be designed to test their understanding of English and workmanlike use of words. Passages will usually be set for summary or precis.

GENERAL KNOWLEDGE

General Knowledge including knowledge of current events and of such matters of every day observation and experience in their scientific aspects as may be expected of an educated person who has not made a special study of any scientific subject. The paper will also include questions on Indian Polity including the political system and the Constitution of India, History of India and Geography of a nature which the candidate should be able to answer without special study.

OPTIONAL SUBJECTS

Total number of questions in the question papers of optional subjects will be eight. All questions will carry equal marks. Each paper will be divided into two parts, viz. Part A and Part B, each part containing four questions. Out of eight questions, five questions are to be attempted. One question in each part will be compulsory. Candidates will be required to answer three more questions out of the remaining six questions, taking at least one question from each Part. In this way, at least two questions will be attempted from each Part i.e. one compulsory question plus one more.

AGRICULTURE

PAPER-I

Ecology and its relevance to man, natural resources, their sustainable management and conservation. Physical and social environment as factors of crop distribution and production. Climatic elements as factors of crop growth, impact of changing environment on cropping pattern as indicators of environments. Environmental pollution and associated hazards to crops, animals, and humans.

Cropping pattern in different agro-climatic zones of the country. Impact of high-yielding and short-duration varieties on shifts in cropping pattern. Concepts of multiple cropping, multistorey, relay and intercropping, and their importance in relation to food production. Package of practices for production of important cereals, pulses, oil seeds, fibres, sugar, commercial and fodder crops grown during Kharif and Rabi seasons in different regions of the country. Important features, scope and propagation of various types of forestry plantations such as extension, social forestry, agro-forestry, and natural forests.

Weeds, their characteristics, dissemination and association with various crops; their multiplication; cultural, biological and chemical control of weeds. Soil-physical, chemical and biological properties. Processes and factors of soil formation. Modern classification of Indian soils, Mineral and organic constituents of soils and their role in maintaining soil productivity. Essential plant nutrients and other beneficial elements in soils and plants. Principles of soil fertility and its evaluation for judicious fertilizer use, integrated nutrient management. Losses of nitrogen in soil, nitrogen-use efficiency in submerged rice soils, nitrogen fixation in soils. Fixation of phosphorus and potassium in soils and the scope for their efficient use. Problem soils and their reclamation methods.

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Soil conservation planning on watershed basis. Erosion and run-off management in hilly, foot hills, and valley lands; processes and factors affecting them. Dry land agriculture and its problems. Technology of stabilising agriculture production in rain fed agriculture area.

Water-use efficiency in relation to crop production, criteria for scheduling irrigations, ways and means of reducing run-off losses of irrigation water. Drip and sprinkler irrigation. Drainage of water-logged soils, quality of irrigation water, effect of industrial effluents on soil and water pollution.

Farm management, scope, important and characteristics, farm planning. Optimum resources use and budgeting. Economics of different types of farming systems.

Marketing and pricing of agricultural inputs and outputs, price fluctuations and their cost; role of co-operatives in agricultural economy; types and systems of farming and factors affecting them.

Agricultural extension, its importance and role, methods of evaluation of extension programmes, socio-economic survey and status of big, small, and marginal farmers and landless agricultural labourers; farm mechanization and its role in agricultural production and rural employment. Training programmes for extension workers; lab-to-land programmes.

PAPER-II

Cell Theory, cell structure, cell organelles and their function, cell division, nucleic acids-structure and function, gene structure and function. Laws of heredity, their significance in plant breeding. Chromosome structure, chromosomal aberrations, linkage and cross-over, and their significance in recombination breeding. Polyploidy, euploid and an euploids. Mutation-micro and macro-and their role in crop improvement. Variation, components of variation. Heritability, sterility and incompatibility, classification and their application in crop improvement. Cytoplasmic inheritance, sex-linked, sex influenced and sex-limited characters.

History of plant breeding. Modes of reproduction, selfing and crossing techniques. Origin and evolution of crop plants, centre of origin, law of homologous series, crop genetic resources-conservation and utilization. Application of principles of plant breeding to the improvement of major field crops. Pure-line selection, pedigree, mass and recurrent selections, combining ability, its significance in plant breeding. Hybrid vigour and its exploitation, backcross method of breeding, breeding for disease and pest resistance, role of inter-specific and inter-generic hybridization. Role of biotechnology in plant breeding. Improved varieties, hybrids, composites of various crop plants.

Seed technology, its importance. Different kinds of seeds and their seed production and processing techniques. Role of public and private sectors in seed production, processing and marketing in India.

Physiology and its significance in agriculture. Imbibitions, surface tension, diffusion and osmosis. Absorption and translocation of water, transpiration and water economy. Enzymes and plant pigments; photosynthesis-modern concepts and factors affecting the process, aerobic and non-aerobic respiration; C, C and CAM mechanisms. Carbohydrate, protein and fat metabolism.

Growth and development; photo-periodism and vernalization. Auxins, hormones, and other plant regulators and their mechanism of action and importance in agriculture. Physiology of seed development and germination; dormancy.

Climatic requirements and cultivation of major fruits, plants, vegetable crops and flower plants; the package of practices and their scientific basis. Handling and marketing problems of fruit and vegetables. Principal methods of preservation of important fruits and vegetable products, processing techniques and equipment. Role of fruits and vegetables in human nutrition. Raising of ornamental plants, and design and layout of lawns and gardens.

Diseases and pests of field vegetables, orchard and plantation crops of India. Causes and classification of plant pests and diseases. Principles of control of plant pests and diseases Biological control of pests and diseases. Integrated pest and disease management. Epidemiology and forecasting. Pesticides, their formulations and modes of action. Compatibility with rhizobial inoculants. Microbial toxins.

Storage pests and diseases of cereals and pulses, and their control.

Food production and consumption trends in India. National and international food policies. Production, procurement, distribution and processing constraints. Relation of food production to national dietary pattern, major deficiencies of calorie and protein.

AGRICULTURAL ENGINEERING

PAPER - I

SECTION A

1. Soil and Water Conservation : Scope of soil and water conservation. Mechanics and types of erosion, their causes. Mechanics and types of erosion, their causes. Rainfall, runoff and sedimentation relationships and their measurement. Soil erosion control measures - biological and engineering including stream bank protection-vegetative barriers, contour bunds, contour

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trenches, contour stone walls, contour ditches, terraces, outlets and grassed waterways. Gully control structures - temporary and permanent - design of permanent soil conservation structures such as chute, drop and drop inlet spillways. Design of farm ponds and percolation ponds. Principles of flood control-flood routing. Watershed Management - investigation, planning and implementation - selection of priority areas and water shed work plan, water harvesting and moisture conservation. Land development - leveling, estimation of earth volumes and costing. Wind Erosion process - design for shelter belts and wind brakes and their management. Forest (Conservation) Act.

2. Aerial Photography and Remote Sensing : Basic characteristics of photographic images, interpretation keys, equipment for interpretation, imagery interpretation for land use, geology, soil and forestry. Remote sensing - merits and demerits of conventional and remote sensing approaches. Types of satellite images, fundamentals of satellite image interpretation, techniques of visual and digital interpretations for soil, water and land use management. Use of GIS in planning and development of watersheds, forests including forest cover, water resources etc.

Section B

3. Irrigation and Drainage : Sources of water for irrigation. Planning and design of minor irrigation projects. Techniques of measuring soil moisture - laboratory and *in situ,* Soil-water plant relationships. Water requirement of crops. Planning conjunctive use of surface and ground water. Measurement of irrigation water, measuring devices - orifices, weirs and flumes. Methods of irrigation - surface, sprinkler and drip, fertigation. Irrigation efficiencies and their estimation. Design and construction of canals, field channels, underground pipelines, head-gates, diversion boxes and structures for road crossing.

Occurrence of ground water, hydraulics of wells, types of wells (tube wells and open wells) and their construction. Well development and testing. Pumps-types, selection and installation. Rehabilitation of sick and failed wells.

Drainage causes of water logging and salt problem. Methods of drainage- drainage of irrigated and unirrigated lands, design of surface, sub-surface and vertical drainage systems. Improvement and utilization of poor quality water. Reclamation of saline and alkali soils. Economics of irrigation and drainage systems. Use of waste water for irrigation - standards of waste water for sustained irrigation, feasibility and economics.

4. Agricultural Structures : Site selection, design and construction of farmstead - farm house, cattle shed, dairy bam, poultry shed, hog housing, machinery and implement shed, storage structures for food grains, feed and forage. Design and construction of fences and farm roads.

Structures for plant environment – green houses, poly houses and shade houses. Common building materials used in construction - timber, brick, stone, tiles, concrete etc and their properties. Water supply, drainage and sanitation system.

PAPER-II

Section A

1. Farm Power and Machinery : Agricultural mechanization and its scope. Sources of farm power - animate and electro-mechanical. Thermodynamics, construction and working of internal combustion engines. Fuel, ignition, lubrication, cooling and governing system of IC engines. Different types of tractors and power tillers. Power transmission, ground drive, power take off (p.t.o.) and control systems. Operation and maintenance of farm machinery for primary and secondary tillage. Traction theory. Sowing transplanting and interculture implements and tools. Plant protection equipment – spraying and dusting. Harvesting, threshing and combining equipment. Machinery for earth moving and land development - methods and cost estimation. Ergonomics of man-machine system. Machinery for horticulture and agro-forestry, feeds and forages. Haulage of agricultural and forest produce.

2. Agro-energy : Energy requirements of agricultural operations and agro-processing. Selection, installation, safety and maintenance of electric motors for agricultural applications. Solar (thermal and photovoltoic), wind and bio-gas energy and their utilization in agriculture. Gasification of biomass for running IC engines and for electric power generation. Energy efficient cooking stoves and alternate cooking fuels. Distribution of electricity for agricultural and agro-industrial applications.

Section B

3. Agricultural Process Engineering : Post harvest technology of crops and its scope. Engineering properties of agricultural produces and by-products. Unit operations - clearing grading, size reduction, densification, concentration, drying/dehydration, evaporation, filtration, freezing and packaging of agricultural produces and by-products. Material handling equipment belt and screw conveyors, bucket elevators, their capacity and power requirement.

Processing of milk and dairy products - homogenization, cream separation, pasteurization, sterilization, spray and roller drying, butter making, ice cream, cheese and shrikhand

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manufacture. Waste and by-product utilization - rice husk, rice bran, sugarcane bagasse, plant residues and coir pith.

4. Instrumentation and computer applications in Agricultural Engineering : Electronic devices and their characteristics-rectifiers, amplifiers, oscillators, multi-vibrators. Digital circuits - sequential and combinational system. Application of microprocessors in data acquisition and control of agricultural engineering processes- measurement systems for level, flow, strain, force, torque, power, pressure, vacuum and temperature. Computers - introduction, input/output devices, central processing unit, memory devices, operating systems, processors, keyboards and printers. Algorithms, flowchart specification, programme translation and problem analysis in Agricultural Engineering. Multimedia and Audio-Visual aids.

ANIMAL HUSBANDRY AND VETERINARY SCIENCE

PAPER-I

1. Animal Nutrition-Energy sources, energy, metabolism and requirements for maintenance and production of milk, meat, eggs and wool. Evaluation of feeds as sources of energy.

1.1. Trends in protein nutrition: sources of protein metabolism and synthesis, protein quantity and quality in relation to requirements. Energy protein ratios in ration.

1.2. Minerals in animal diet : Sources, functions, requirements and their relationship of the basic minerals nutrients including trace elements.

1.3. Vitamins, Hormones and Growth Stimulating, substances : Sources, functions, requirements and inter-relationship with minerals.

1.4. Advances in Ruminant Nutrition-Dairy Cattle: Nutrients and their metabolism with reference to milk production and its composition. Nutrient requirements for calves, heifers, dry and milking cows and buffaloes. Limitations of various feeding systems.

1.5 Advances in Non-Ruminant Nutrition-Poultry-Nutrients and their metabolism with reference to poultry, meat and egg production, Nutrients requirements and feed formulation and broilers at different ages.

1.6 Advances in Non-Ruminant Nutrition-Swine-Nutrients and their metabolism with special reference to growth and quality of meat production, Nutrient requirement and feed formulation for baby-growing and finishing pigs.

1.7. Advances in Applied Animal Nutrition-A critical review and evaluation of feeding experiments, digestibility and balance studies. Feeding standards and measures of food energy. Nutrition requirements for growth, maintenance and production. Balanced rations.

2. Animal Physiology :

2.1 Growth and Animal Production : Prenatal and postnatal growth, maturation, growth curves, measures of growth, factors affecting growth, conformation, body composition, meat quality.

2.2 Milk Production and Reproduction and Digestion : Current status of hormonal control of mammary development, milk secretion and milk ejection. Male and Female reproduction organ, their components and function. Digestive organs and their functions.

2.3 Environmental Physiology : Physiological relations and their regulation; mechanisms of adaptation, environmental factors and regulatory mechanism involved in animal behaviour, methods of controlling climatic stress.

2.4 Semen quality : Preservation and Artificial Insemination-Components of semen, composition of spermatozoa, chemical and physical properties of ejaculated semen, factors affecting semen in vivo and in vitro. Factors affecting semen production and quality preservation, composition of diluents, sperm concentration, transport of diluted semen. Deep Freezing techniques in cows, sheep and goats, swine and poultry.

Detection of estrus and time of insemination for better conception.

3. Livestock Production and Management :

3.1 Commercial Dairy Farming-Comparison of dairy farming in India with advanced countries. Dairying under fixed farming and as a specialised farming, economic dairy farming, Starting of a dairy farm. Capital and land requirement, organisation of the dairy farm.

Procurement of goods; opportunities in dairy farming, factors determining the efficiency of dairy animal, Herd recording, budgeting, cost of milk production; pricing policy; Personnel Management. Developing Practical and Economic ration for dairy cattle; supply of greens throughout the year, field and fodder requirements of Dairy Farm, Feeding regimes for day and young stock and bulls, heifers and breeding animals, new trends in feeding young and adult stock; Feeding records.

3.2 Commercial meat, egg and wool production: Development of practical and economic rations for sheep, goats, pigs, rabbits and poultry. Supply of greens, fodder, feeding regimens for young and mature stock. New trends in enhancing production and management. Capital and land requirements and socio-economic concept.

3.3 Feeding and management of animals under drought, flood and other natural calamities.

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4. Genetics and Animal Breeding : Mitosis and Meiosis; Mendelian inheritance; deviations to Mendelian genetics; Expression of genes; Linkage and crossing over; Sex determination, sex influenced and sex limited characters; Blood groups and polymorphism; Chromosome aberrations; Gene and its structure; DNA as a genetic material; Genetic code and protein synthesis; Recombinant DNA technology, Mutations, types of mutations, methods for detecting mutations and mutation rate.

4.1 Population Genetics Applied to Animal Breeding: Quantitative Vs. qualitative traits; Hardy Weinberg Law; Population Vs. individual; Gene and genotypic frequency; Forces changing gene frequency; Random drift and small populations; Theory of path coefficient; Inbreeding, methods of estimating inbreeding coefficient, systems of inbreeding; Effective population size; Breeding value, estimation of breeding value, dominance and epistatic deviation; partitioning of variation; Genotype X environment correlation and genotype X environment interaction; Role of multiple measurements; Resemblance between relatives.

4.2 Breeding Systems : Heritability, repeatability and genetic and phenotypic correlations, their methods of estimation and precision of estimates; Aids to selection and their relative merits; Individual, pedigree, family and within family selection; Progeny testing; Methods of selection; Construction of selection indices and their uses; Comparative evaluation of genetic gains through various selection methods; Indirect selection and Correlated response; Inbreeding, upgrading, cross-breeding and synthesis of brees; Crossing of inbred lines for commercial production; Selection for general and specific combining ability; Breeding for threshold character.

Paper II

1. Health and Hygiene

1.1. Histology and Histological Techniques : Stains-Chemical classification of stains used in biological work-principles of staining tissues-mordants-progressive & regressive stains-differential staining of cytoplasmic and connective tissue elements-Methods of preparation and processing of tissues-celloidin embedding-Freezing microtomy-Microscopy-Bright field microscope and electron microscope. Cytology-structure of cell, organells & inclusions; cell division-cell types-Tissues and their classification-embryonic and adult tissues-Comparative histology of organs:- vascular, Nervous, digestive, respiratory, musculo-skeletal and urogenital systems-Endocrine glands-Integuments-sense organs.

1.2. Embryology : Embryology of vertebrates with special reference to aves and domestic mammals-gametogenesis-fertilization-germ layers-foetal membranes & placentation-types of placenta in domestic mammals-Teratology-twin & twinning-organogenesis-germ layer derivatives-endodermal, mesodermal and ectodermal derivatives.

1.3 Bovine Anatomy-Regional Anatomy: Paranasal sinuses of OX-surface anatomy of salivary glands. Regional anatomy of infraorbital, maxillary, mandibuloalveolar, mental & coronal nerve block-Regional anatomy of para-vertebral nerves, pudental nerve, median, ulnar & radial nerves-tibial, fibular and digital nerves-Cranial nerves-structures involved in epidural anaesthesia-superficial lymph nodes-surface anatomy of visceral organs of thoracic, abdominal and pelvic cavities-comparative features of locomotor apparatus & their application in the biomechanics of mammalian body.

1.4 Anatomy of Fowl : Musculo-skeletal system-functional anatomy in relation to respiration and flying, digestion and egg production.

1.5 Physiology of blood and its circulation, respiration; excretion, Endocrine glands in health and disease.

1.5.1 Blood constituents : Properties and functions-blood cell formation-Haemoglobin synthesis and chemistry-plasma proteins production, classification and properties; coagulation of blood; Haemorrhagic disorders-anticoagulants-blood groups-Blood volume-Plasma expanders-Buffer systems in blood. Biochemical tests and their significance in disease diagnosis.

1.5.2. Circulation: Physiology of heart, cardiac cycle-heart sounds, heartbeat, electro-cardiograms, Work and efficiency of heart-effect of ions on heart function-metabolism of cardiac muscle, nervous and chemical regulation of heart, effect of temperature and stress on heart, blood pressure and hypertension, Osmotic regulation, arterial pulse, vasomotor regulation of circulation, shock. Coronary & pulmonary circulation, Blood-Brain barrier-Cerebrospinal fluid-circulation in birds.

1.5.3 Respiration : Mechanism of respiration, Transport and exchange of gases-neural control of respiration-chemo receptors-hypoxia-respiration in birds.

1.5.4 Excretion: Structure and function of kidney-formation of urine methods of studying renal function-renal regulation of acid-base balance; physiological constituents of urine-renal failure-passive venous congestion-Urinary recreation in chicken-Sweat glands and their function. Biochemical tests for urinary dysfunction.

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1.5.5 Endocrine glands : Functional disorders, their symptoms and diagnosis. Synthesis of hormones, mechanism and control of secretion-hormonal receptors classification and function.

1.6. General knowledge of pharmacology and therapeutics of drugs : Cellular level of pharmaco-dynamics and pharmaco-kinetics-Drugs acting on fluids and electrolyte balance-drugs acting on Autonomic nervous system-Modern concepts of anaesthesia and dissociative Anaesthetics-Autocoids-Antimicrobials and principles of chemotherapy in microbial injections-use of hormones in therapeutics-chemotherapy of parasitic infections-Drug and economic persons in the Edible tissues of animals-chemotherapy of Neoplastic diseases.

1.7. Veterinary Hygiene with reference to water, air and habitation : Assessment of pollution of water, air and soil-Importance of climate in animal health-effect of environment on animal function and performance-relationship between industrialization and animal agriculture-animal housing requirements for specific categories of domestic animals viz. pregnant cows & sows, milking cows, broiler birds-stress, strain & productivity in relation to animal habitation.

2. Animal Diseases :

2.1 Pathogenesis, symptoms, postmortem lesions, diagnosis, and control of infection diseases of cattle, pigs and poultry, horses, sheep and goats.

2.2 Etiology, symptoms, diagnosis, treatment of production diseases of cattle, pig and poultry.

2.3 Deficiency diseases of domestic animals and birds.

2.4 Diagnosis and treatment of nonspecific condition like impaction, Bloat, Diarrhoea, Indigestion, dehydration, stroke, poisoning.

2.5 Diagnosis and treatment of neurological disorders.

2.6 Principles and methods of immunization of animals against specific diseases-hard immunity-disease free zones-'zero' disease concept-chemoprophylaxis.

2.7 Anesthesia-local, regional and general-pre-anesthetic medication, Symptoms and surgical interference in fractures and dislocation, Hernia, choking, abomassal displacement-Caesarian operations, Rumenotomy-Castrations.

2.8 Disease investigation techniques-Materials for laboratory investigation-Establishment Animal Health Centres-Disease free zone.

3. Veterinary Public Health

3.1 Zoonoses : Classification, definition; role of animals and birds in prevalence and transmission of zoonotic diseases occupational zoonotic diseases.

3.2. Epidemiology : Principles, definition of epidemiological terms, application of epidemiological measures in the study of diseases and disease control, Epidemiological features of air, water and food borne infections.

3.3 Veterinary Jurisprudence : Rules and Regulations for improvement of animal quality and prevention of animal diseases-state and control Rules for prevention of animal and animal product borne diseases-S.P. C.A.-veterolegal cases-certificates-Materials and Methods of collection of samples for veterolegal investigation.

4. Milk and Milk Products Technology :

4.1 Milk Technology : Organization of rural milk procurement, collection and transport of raw milk.

Quality, testing and grading raw milk, Quality storage grades of whole milk, Skimmed milk and cream.

Processing, packaging, storing, distributing, marketing defects and their control and nutritive properties of the following milks : Pasteurized, standardized, toned, double toned, sterilized, homogenized, reconstituted, recombined and flavoured milks. Preparation of cultured milks, cultures and their management, youghurt, Dahi, Lassi and Srikhand. Preparation of flavoured and sterlized milks. Legal standards, Sanitation requirement for clean and safe milk and for the milk plant equipment.

4.2 Milk Products Technology : Selection of raw materials, assembling, production, processing, storing, distributing and marketing milk products such as Butter, Ghee, Khoa, Channa, Cheese; Condensed, evaporated, dried milk and baby food; Ice cream and Kulfi; by products; whey products, butter milk, lactose and casein. Testing Grading, judging milk products-BIS and Agmark specifications, legal standards, quality control nutritive properties. Packaging, processing and operational control Costs.

5. Meat Hygiene and Technology :

5.1 Meat Hygiene :

5.1.1 Ante mortem care and management of food animals, stunning, slaughter and dressing operations; abattoir requirements and designs; Meat inspection procedures and judgement of carcass meat cuts-drading of carcass meat cuts-duties and functions of Veterinarians in Wholesome meat production.

5.1.2 Hygienic methods of handling production of meat-spoilage of meat and control measures-Post slaughter physicochemical changes in meat and factors that influence them-

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quality improvement methods-Adulteration of meat and defection-Regulatory provisions in Meat trade and Industry.

5.2. Meat Technology

5.2.1 Physical and chemical characteristics of meat-meat emulsions-methods of preservation of meat-curing, canning, irradiation, packaging of meat and meat products; meat products and formulations.

5.3. Byproducts : Slaughter house by products and their utilisation-Edible and inedible byproducts-social and economic implications of proper utilisation of slaughter house byproducts-Organ products for food and pharmaceuticals.

5.4. Poultry Products Technology : Chemical composition and nutritive value of poultry meat, pre slaughter care and management. Slaughtering techniques, inspection, preservation of poultry meat, and products. Legal and BIS standards. Structure, composition and nutritive value of eggs. Microbial spoilage. Preservation and maintenance. Marketing of poultry meat, eggs and products.

5.5. Rabbit/Fur Animal farming : Care and management of rabbit meat production. Disposal and utilization of fur and wool and recycling of waste byproducts. Grading of wool.

6. Extension : Basic philosophy, objectives, concept and principles of extension. Different Methods adopted to educate farmers under rural conditions. Generation of technology, its transfer and feedback. Problems of constraints in transfer of technology. Animal husbandry programmes for rural development.

BOTANY

PAPER-I

1. Microbiology and Plant Pathology: Viruses, bacteria, and plasmids-structure and reproduction. General account of infection, Phytoimmunology. Applications of microbiology in agriculture, industry, medicine and pollution control in air, soil and water.

Important plant diseases caused by viruses, bacteria, mycoplasma, fungi and nematodes. Mode of infection and dissemination. Molecular basis of infection and disease resistance/ defence. Physiology of parasitism and control measures. Fungal toxins.

2. Cryptogams: Algae, Fungi, Bryophytes, Pteridophytes-structure and reproduction from evolutonary viewpoint. Distribution of Cryptogams in India and their economic potential.

3. Phanerogams: Gymnosperms: Concept of Progymonosperms. Classification and distribution of Gymnosperms. Salient features of Cycadales, Coniferrals and Gnetales, their structures and reproduction. General account of Cycadofilicales, Bennettitales and Cordaitales.

Angiosperms: Systematics, anatomy, embryology, palynology and phylogeny. Comparative account of various systems of Angiosperm Classiification. Study of angiospermic families-Magnoliaceae, Ranunculaceae, Brassicaceae (Cruciferae), Rosaceae, Leguminosae, Euphorbiaceae, Malvaceaie, Dipterocarpaceae, Apiaceae (Umbelliferae), Asclepiadaceae, Verbenaceae, Solanaceae, Rubiaceae, Cucurbitaceae, Asteraceae (Composite), Poaceae (Gramineae), Arecaceae (Palmae), Liliaceae, Musaceae, Orchidaceae.

Stomata and their types. Anomalous secondary growth, Anatomy of C 3 and C 4 plants.

Development of male and female gametophytes, pollination, fertilization. Endosperm-its development and function. Patterns of embryo development. Polyembryony, apoxmix, Applications of palynology.

4. Plant Utility and Exploitation:

Origin of cultivated plants, Vavilov's centres of origin. Plants as sources for food, fodder, fibres, spices, beverages, drugs, narcotics, insecticides, timber, gums, resins and dyes.

Latex, cellulose Starch and their products. Perfumery. Importance of Ethnobotany in Indian context. Energy plantation. Botanical Gardens and Herbaria.

5. Morphogenesis: Totipotency, polarity, symmetry and differentiation. Cell, tissue, organ and protoplast culture. Somatic hybrids and Cybrids.

PAPER-II

1. Cell Biology: Techniques of Cell Biology. Prokaryotic and eukaryotic cells - structural and ultra structural details. Structure and function of extra cellular matrix or ECM (cell wall) and membranes cell adhesion, membrane transport and vesicular transport. Structure and function of cell organelles (chloroplasts, mitochondria, ER, ribosome's, embosoms, lissome, peroxisomes, hydrogeno-some). Nucleus, nucleolus, nuclear pore complex. Chromatin and nucleosome. Cell signalling and cell receptors. Signal transduction (G-1 proteins, etc.). Mitosis and meisdosis; molecular basis of cell cycle. Numerical and structural variations in chromosomes and their significance. Study of polygene, lamp brush and B-chromosomes-structure, behaviour and significance.

2. Genetics, Molecular Biology and Evolution: Development of genetics, and gene versus allele concepts (Pseudo alleles). Quantitative genetics and multiple factors. Linkage and crossing over-methods of gene mapping including molecular maps (idea of mapping function).

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Sex chromosomes and sex linked inheritance, sex determination and molecular basis of sex differentiation. Mutation (biochemical and molecular basis). Cytoplasmic inheritance and cytoplasmic genes (including genetics of male sterility). Prions and prion hypothesis.
Structure and synthesis of nucleic acids and proteins. Genetic code and regulation of gene expression. Multigene families.
Organic evolution-evidences, mechanism and theories. Role of RNA in origin and evolution.
3. Plant Breeding, Biotechnology and Biostatistics: Methods of plant breeding-introduction, selection and hybridization (pedigree, backcross, mass selection, bulk method). Male sterility and heterosis breeding. Use of apomixes in plant breeding. Micro propagation and genetic engineering-methods of transfer of genes and transgenic crops; development and use of molecular markers in plant breeding.
Standard deviation and coefficient of variation (CV). Tests of significance (Z-test, t-test and chi-square tests). Probability and distributions (normal, binomial and Poisson distributions). Correlation and regression.
4. Physiology and Biochemistry: Water relations, Mineral nutrition and ion transport, mineral deficiencies. Photosynthesis-photochemical reactions, photophosphorylation and carbon pathways including C pathway (photorespiration), C, C and CAM pathways. Respiration (anaerobic and aerobic, including fermentation-electron transport chain and oxidative phosphorylation. Chemiosmotic theory and ATP synthesis. Nitrogen fixation and nitrogen metabolism. Enzymes, coenzymes, energy transfer and energy conservation. Importance of secondary metabolites. Pigments as photoreceptors (plastidial pigments and phytochrome). Photoperiodism and flowering, vernalization, senescence. Growth substances-their chemical nature, role and applications in agri-horticulture, growth indices, growth movements. Stress physiology (heat, water, salinity, metal). Fruit and seed physiology. Dormancy, storage and germination of seed. Fruit ripening -- its molecular basis and manipulation.
5. Ecology and Plant Geography: Ecological factors. Concepts and dynamics of community. Plant succession. Concepts of biosphere. Ecosystems and their conservation. Pollution and its control (including phytoremediation).
Forest types of India -- afforestation, deforestation and social forestry. Endangered plants, endemism and Red Data Books. Bio-diversity. Convention of Biological Diversity, Sovereign Rights and Intellectual Property Rights. Biogeochemical cyeles. Global warming.

CHEMISTRY
PAPER-I

1. Atomic structure
Quantum theory, Heisenberg's uncertainty principle, Schrödinger wave equation (time independent). Interpretation of wave function, particle in one-dimensional box, quantum numbers, hydrogen atom wave functions. Shapes of s, p and d orbitals.
2. Chemical bonding
Ionic bond, characteristics of ionic compounds, factors affecting stability of ionic compounds, lattice energy, Born-Haber cycle; covalent bond and its general characteristics, polarities of bonds in molecules and their dipole moments. Valence bond theory, concept of resonance and resonance energy. Molecular orbital theory (LCAO method); bonding in homonuclear molecules: H2+, H2 to Ne2, NO, CO, HF, CN, CN-, BeH2 and CO2. Comparison of valence bond and molecular oribtal theories, bond order, bond strength and bond length.
3. SOLID STATE
Forms of solids, law of constancy of interfacial angles, crystal systems and crystal classes (crystallographic groups). Designation of crystal faces, lattice structures and unit cell. Laws of rational indices. Bragg's law. X-ray diffraction by crystals. Close packing, radius ratio rules, calculation of some limiting radius ratio values. Structures of NaCl, ZnS, CsCl, CaF2, CdI2 and rutile. Imperfections in crystals, stoichiometric and non-stoichiometric defects, impurity defects, semi-conductors. Elementary study of liquid crystals.
4. The gaseous state
Equation of state for real gases, intermolecular interactions, liquification of gases and critical phenomena, Maxwell's distribution of speeds, intermolecular collisions, collisions on the wall and effusion.
5. Thermodynamics and statistical thermodynamics
Thermodynamic systems, states and processes, work, heat and internal energy; first law of thermodynamics, work done on the systems and heat absorbed in different types of processes; calorimetry, energy and enthalpy changes in various processes and their temperature dependence.
Second law of thermodynamics; entropy as a state function, entropy changes in various process, entropy-reversibility and irreversibility, Free energy functions; criteria for equilibrium,

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relation between equilibrium constant and thermodynamic quantities; Nernst heat theorem and third law of thermodynamics.
Micro and macro states; canonical ensemble and canonical partition function; electronic, rotational and vibrational partition functions and thermodynamic quantities; chemical equilibrium in ideal gas reactions.

6. Phase equilibria and solutions

Phase equilibria in pure substances; Clausius-Clapeyron equation; phase diagram for a pure substance; phase equilibria in binary systems, partially miscible liquids-upper and lower critical solution temperatures; partial molar quantities, their significance and determination; excess thermodynamic functions and their determination.

7. Electrochemistry

Debye-Huckel theory of strong electrolytes and Debye-Huckel limiting Law for various equilibrium and transport properties.
Galvanic cells, concentration cells; electrochemical series, measurement of e.m.f. of cells and its applications fuel cells and batteries.
Processes at electrodes; double layer at the interface; rate of charge transfer, current density; overpotential; electroanalytical techniques-voltametry, polarography, amperometry, cyclic-voltametry, ion selective electrodes and their use.

8. Chemical kinetics

Concentration dependence of rate of reaction; defferential and integral rate equations for zeroth, first, second and fractional order reactions. Rate equations involving reverse, parallel, consecutive and chain reactions; effect of temperature and pressure on rate constant. Study of fast reactions by stop-flow and relaxation methods. Collisions and transition state theories.

9. Photochemistry

Absorption of light; decay of excited state by different routes; photochemical reactions between hydrogen and halogens and their quantum yields.

10. Surface phenomena and catalysis

Adsorption from gages and solutions on solid adsorbents, adsorption isotherms-Langmuir and B.E.T. isotherms; determination of surface area, characteristics and mechanism of reaction on heterogeneous catalysts.

11. Bio-inorganic chemistry

Metal ions in biological systems and their role in ion-transport across the membranes (molecular mechanism), ionophores, photosynthesis-PSI, PSII; nitrogen fixation, oxygen-uptake proteins, cytochromes and ferredoxins.

12. Coordination chemistry

(a) Electronic configurations; introduction to theories of bonding in transition metal complexes. Valence bond theory, crystal field theory and its modifications; applications of theories in the explanation of magnetism and electronic spactra of metal complexes.
(b) Isomerism in coordination compounds. IUPAC nomenclature of coordination compounds; stereochemistry of complexes with 4 and 6 coordination numbers; chelate effect and polynuclear complexes; trans effect and its theories; kinetics of substitution reactions in square-planer complexes; thermodynamic and kinetic stability of complexes.
(c) Synthesis and structures of metal carbonyls; carboxylate anions, carbonyl hydrides and metal nitrosyl compounds.
(d) Complexes with aromatic systems, synthesis, structure and bonding in metal olefin complexes, alkyne complexes and cyclopentadienyl complexes; coordinative unsaturation, oxidative addition reactions, insertion reactions, fluxional molecules and their characterization. Compounds with metal-metal bonds and metal atom clusters.

13. General chemistry of 'f' block elements

Lanthanides and actinides; separation, oxidation states, magnetic and spectral properties; lanthanide contraction.

14. Non-Aqueous Solvents

Reactions in liquid NH3, HF, SO2 and H2 SO4. Failure of solvent system concept, coordination model of non-aqueous solvents. Some highly acidic media, fluoro-sulphuric acid and super acids.

PAPER II

1. Delocalised covalent bonding : Aromaticity, anti-aromaticity; annulenes, azulenes, tropolones, kekulene, fulvenes, sydnones.

2 (a) Reaction mechanisms : General methods (both kinetic and non-kinetic) of study of mechanism or organic reactions illustrated by examples-use of isotopes, cross-over experiment, intermediate trapping, stereochemistry; energy diagrams of simple organic reactions-transition states and intermediates; energy of activation; thermodynamic control and kinetic control of reactions.

(b) Reactive intermediates : Generation, geometry, stability and reactions of carbonium

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and carbanium ions, carbanions, free radicals, carbenes, benzynes and niternes.
(c) Substitution reactions : SN1, SN2, SNi, SN1', SN2', SNi' and SRN1 mechanisms; neighbouring group participation; electrophilic and nucleophilic reactions of aromatic compound including simple heterocyclic compounds-pyrrole, thiophene, indole.
(d) Elimination reactions : E1, E2 and E1cb mechanisms; orientation in E2 reactions-Saytzeff and Hoffmann; pyrolytic syn elimination-acetate pyrolysis, Chugaev and Cope eliminations.
(e) Addition reactions : Electrophilic addition to C=C and C=C; nucleophilic addition to C=O, C=N, conjugated olefins and carbonyls.
(f) Rearrangements : Pinacol-pinacolune, Hoffmann, Beckmann, Baeyer-Villiger, Favorskii, Fries, Claisen, Cope, Stevens and Wagner-Meerwein rearrangements.
3. Pericyclic reactions : Classification and examples; Woodward-Hoffmann rules-clectrocyclic reactions, cycloaddition reactions [2+2 and 4+2] and sigmatropic shifts [1, 3; 3, 3 and 1, 5] FMO approach.
4. Chemistry and mechanism of reactions : Aldol condensation (including directed aldol condensation), Claisen condensation, Dieckmann, Perkin, Knoevenagel, Witting, Clemmensen, Wolff-Kishner, Cannizzaro and von Richter reactions; Stobbe, benzoin and acyloin condensations; Fischer indole synthesis, Skraup synthesis, Bischler-Napieralski, Sandmeyer, Reimer-Tiemann and Reformatsky reactions.
5. Polymeric Systems
(a) Physical chemistry of polymers : Polymer solutions and their thermodynamic properties; number and weight average molecular weights of polymers. Determination of molecular weights by sedimentation, light scattering, osmotic pressure, viscosity, end group analysis methods.
(b) Preparation and properties of polymers : Organic polymers-polyethylene, polystyrene, polyvinyl chloride, Teflon, nylon, terylene, synthetic and natural rubber. Inorganic polymers-phosphonitrilic halides, borazines, silicones and silicates.
(c) Biopolymers : Basic bonding in proteins, DNA and RNA.
6. Synthetic uses of reagents : OsO4, HIO4, CrO3, Pb(OAc)4, SeO2, NBS, B2H6, Na-Liquid NH3, LiA1H4, NaBH4 n-BuLi, MCPBA.
7. Photochemistry : Photochemical reactions of simple organic compounds, excited and ground states, singlet and triplet states, Norrish-Type I and Type II reactions.
8. Principles of spectroscopy and applications in structure elucidation
(a) Rotational spectra-diatomic molecules; isotopic substitution and rotational constants.
(b) Vibrational spectra-diatomic molecules, linear triatomic molecules, specific frequencies of functional groups in polyatomic molecules.
(c) Electronic spectra : Singlet and triplet states. N->π* and π->π* transitions; application to conjugated double bonds and conjugated carbonyls-Woodward-Fieser rules.
(d) Nuclear magnetic resonance : Isochronous and anisochronous protons; chemical shift and coupling constants; Application of H1 NMR to simple organic molecules.
(e) Mass spectra : Parent peak, base peak, daughter peak, metastable peak, fragmentation of simple organic molecules; £-cleavage, McLafferty rearrangement.
(f) Electron spin resonance : Inorganic complexes and free radicals.

CHEMICAL ENGINEERING

PAPER-I

Section A

(a) Fluid and Particle Dynamics
Viscosity of fluids. Laminar and turbulent flows. Equation of continuity and Navier-Stokes equition-Bernoulli's theorem. Flow meters. Fluid drag and pressure drop due to friction, Reynold's Number and friction factor - effect of pipe roughness. Economic pipe diameter. Pumps, water, air/steam jet ejectors, compressors, blowers and fans. Agitation and mixing of liquids. Mixing of solids and pastes. Crushing and Grinding - principles and equipment. Rittinger's and Bond's laws. Filtration and filtration equipment. Fluid-particle mechanics - free and hindered settling. Fluidisation and minimum fluidization velocity, concepts of compressible and incompressible flow. Transport of Solids.
(b) Mass Transfer
Molecular diffusion coefficients, First and second law and diffusion, mass transfer coefficients, film and penetration theories of mass transfer. Distillation, simple distillation, relative volatility, fractional distillation, plate and packed columns for distillation. Calculation of theoretical number of plates. Liquid-liquid equilibria. Extraction - theory and practice; Design of gas-absorption columns. Drying. Humidification, dehumidification. Crystallisation. Design of equipment.
(c) Heat Transfer
Conduction, thermal conductivity, extended surface heat transfer.

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Convection - free and forced. Heat transfer coefficients - Nusselt Number. LMTD and effectiveness. NTU methods for the design of Double Pipe and Shell & Tube Heat Exchangers. Analogy between heat and momentum transfer. Boiling and condensation heat transfer. Single and multiple-effect evaporators. Rediation - Stefan-Boltzman Law, emissivity and absorptivity. Calculation of heat load of a furnace. Solar heaters.

Section B

(d) Noval Separation Processes

Equilibrium separation processes – ion-exchange, osmosis, electro-dialysis, reverse osmosis, ultra-filtration and other membrane processes. Molecular distillation. super critical fluid extraction.

(e) Process Equipment Design

Factors affecting vessel design criteria - Cost considerations. Design of storage vessels-vertical, horizontal spherical, underground tanks for atmospheric and higher pressure. Design of closures flat and elliptical head. Design of supports. Materials of construction-characteristics and selection.

(f) Process Dynamics and Control

Measuring instruments for process variables like level, pressure, flow, temperature pH and concentration with indication in visual/pneumatic/analog/digital signal forms. Control variable, manipulative variable and load variables. Linear control theory-Laplace, transforms. PID controllers. Block diagram representation transient and frequency response, stability of closed loop system. Advanced control strategies. Computer based process control.

Paper-II

Section A

(a) Material and Energy Balances

Material and energy balance calculations in processes with recycle/bypass/purge. Combustion of solid/ liquid/gaseous fuels, stoichiometric relationships and excess air requirements. Adiabatic flame temperature.

(b) Chemical Engineering Thermodynamics

Laws of thermodynamics. PVT relationships for pure components and mixtures. Energy functions and inter-relationships - Maxwell's relations. Fugacity, activity and chemical potential. Vapour-liquid equilibria, for ideal/non-ideal, single and multi-component systems. criteria for chemical reaction equilibrium, equilibrium constant and equilibrium conversions. Thermodynamic cycles - refrigeration and power.

(c) Chemical Reaction Engineering :

Batch reactors - kinetics of homogeneous reactions and interpretation of kinetic data. Ideal flow reactors - CSTR, plug flow reactors and their performance equations. Temperature effects and run-away reactions. Heterogeneous reactions – catalytic and non-catalytic and gas-solid and gas-liquid reactions. Intrinsic kinetics and global rate concept. Importance of inter-phase and intra-particle mass transfer on performance. Effectiveness factor. Isothermal and non-isothermal reactors and reactor stability.

Section B

(d) Chemical Technology

Natural organic products - Wood and wood-based chemicals, pulp and paper, Agro industries - sugar, Edible oils extraction (including tree based seeds), Soaps and detergents. Essential oils – Biomass gasification (including biogas). Coal and coal chemical. Petroleum and Natural gas-Petroleum refining (Atomospheric distillation/ cracking/reforming) - Petrochemical industries – Polyethylenes (LDPE/HDPE/LLDPE), Polyvinyl Chloride, Polystyrene. Ammonia manufacture. Cement and lime industries. Paints and varnishes. Glass and ceremics. Fermentation - alcohol and antibiotics.

(e) Environmental Engineering and Safety

Ecology and Environment. Sources of pollutants in air and water. Green house effect, ozone layer depletion, acid rain. Micrometeorology and dispersion of pollutants in environment. Measurement techniques of pollutant levels and their control strategies. Solid wastes, their hazards and their disposal techniques. Design and performance analysis of pollution control equipment. Fire and explosion hazards rating - HAZOP and HAZAN. Emergency planning, disaster management. Environmental legislations - water, air environment protection Acts. Forest (Conservation) Act.

(f) Process Engineering Economics :

Fixed and working capital requirement for a process industry and estimation methods. Cost estimation and comparison of alternatives. Net present value by discounted cash flow. Pay back analysis. IRR, Depreciation, taxes and insurance. Break-even point analysis. Project scheduling - PERT and CPM. Profit and loss account, balance sheet and financial statement. Plant location and plant layout including piping.

CIVIL ENGINEERING

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PAPER-I

Part-A : ENGINEERING MECHANICS,

STRENGTH OF MATERIALS AND STRUCTURAL ANALYSIS.

ENGINEERING MECHANICS :

Units and Dimensions, SI Units, Vectors, Concept of Force, Concept of particle and rigid body. Concurrent, Non Concurrent and parallel forces in a plane, moment of force and Varignon's theorem, free body diagram, conditions of equilibrium, Principle of virtual work, equivalent force system.

First and Second Moment of area, Mass moment of Inertia.

Static Friction, Inclined Plane and bearings.

Kinematics and Kinetics :

Kinematics in Cartesian and Polar Coordinates, motion under uniform and non-uniform acceleration, motion under gravity. Kinetics of particle : Momentum and Energy principles, D' Alembert's Principle, Collision of elastic bodies, rotation of rigid bodies, simple harmonic motion, Flywheel.

STRENGTH OF MATERIALS :

Simple Stress and Strain, Elastic constants, axially loaded compression members, Shear force and bending moment, theory of simple bending, Shear Stress distribution across cross sections, Beams of uniform strength, Leaf spring. Strain Energy in direct stress, bending & shear. Deflection of beams : Mecaulay's method, Mohr's Moment area method, Conjugate beam method, unit load method. Torsion of Shafts, Transmission of power, close coiled helical springs, Elastic stability of columns, Euler's Rankine's and Secant formulae. Principal Stresses and Strains in two dimensions, Mohr's Circle, Theories of Elastic Failure, Thin and Thick cylinder : Stresses due to internal and external pressure-Lame's equations.

STRUCTURAL ANALYSIS :

Castiglianio's theorems I and II, unit load method, method of consistent deformation applied to beams and pin jointed trusses. Slope-deflection, moment distribution, Kani's method of analysis and column Analogy method applied to indeterminate beams and rigid frames.

Rolling loads and Influences lines : Influences lines for Shear Force and Bending moment at a section of a beam. Criteria for maximum shear force and bending Moment in beams traversed by a system of moving loads. Influences lines for simply supported plane pin jointed trusses.

Arches : Three hinged, two hinged and fixed arches, rib shortening and temperature effects, influence lines in arches.

Matrix methods of analysis : Force method and displacement method of analysis of indeterminate beams and rigid frames.

Plastic Analysis of beams and frames : Theory of plastic bending, plastic analysis, statical method, Mechanism method.

Unsymmetrical bending : Moment of inertia, product of inertia, position of Neutral Axis and Principle axes, calculation of bending stresses.

Part-B

DESIGN OF STRUCTURES : STEEL, CONCRETE AND MASONRY STRUCTURES.

STRUCTURAL STEEL DESIGN :

Structural Steel : Factors of safety and load factors. Rivetted, bolted and welded joints and connections. Design of tension and compression members, beams of built up section, rivetted and welded plate girders, gantry girders, stancheons with battens and lacings, slab and gusseted column bases.

Design of highway and railway bridges : Through and deck type plate girder, Warren girder, Pratt truss.

DESIGN OF CONCRETE AND MASONRY STRUCTURES :

Concept of mix design. Reinforced Concrete : Working Stress and Limit State method of design-Recommendations of I.S. codes design of one way and two way slabs, stair-case slabs, simple and continuous beams of rectangular, T and L sections. Compression members under direct load with or without eccentricity, Isolated and combined footings.

Cantilever and Counter fort type retaining walls.

Water tanks : Design requirements for Rectangular and circular tanks resting on ground.

Prestressed concrete : Methods and systems of prestressing, anchorages, Analysis and design of sections for flexure based on working stress, loss of prestress.

Design of brick masonry as per I.S. Codes.

Design of masonry retaining walls.

Part-C

FLUID MECHANICS, OPEN CHANNEL FLOW AND HYDRAULIC MACHINES

Fluid Mechanics : Fluid properties and their role in fluid motion, fluid statics including forces acting on plane and curve surfaces.

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Kinematics and Dynamics of Fluid flow : Velocity and accelerations, stream lines, equation of continuity, irrotational and rotational flow, velocity potential and stream functions, flownet, methods of drawing flownet, sources and sinks, flow separation, free and forced vortices.
Control volume equation, continuity, momentum, energy and moment of momentum equations from control volume equation, Navier-Stokes equation, Euler's equation of motion, application to fluid flow problems, pipe flow, plane, curved, stationary and moving vanes, sluice gates, weirs, orifice meters and Venturi meters.
Dimensional Analysis and Similitude: Buckingham's Pi-theorem, dimensionless parameters, similitude theory, model laws, undistorted and distorted models.
Laminar Flow : Laminar flow between parallel, stationary and moving plates, flow through tube.
Boundary layer : Laminar and turbulent boundary layer on a flat plate, laminar sub-layer, smooth and rough boundaries, drag and lift.
Turbulent flow through pipes : Characteristics of turbulent flow, velocity distribution and variation of pipe friction factor, hydraulic grade line and total energy line, siphons, expansion and contractions in pipes, pipe networks, water hammer in pipes and surge tanks.
Open channel flow : Uniform and non-uniform flows, momentum and energy correction factors, specific energy and specific force, critical depth, resistance equations and variation of roughness coefficient, rapidly varied flow, flow in contractions, flow at sudden drop, hydraulic jump and its applications surges and waves, gradually varied flow, classification of surface profiles, control section, step method of integration of varied flow equation, moving surges and hydraulic bore.

HYDRAULIC MACHINES AND HYDROPOWER :

Centrifugal pumps-Types, characteristics, Net Positive Suction Height (NPSH), specific speed. Pumps in parallel.
Reciprocating pumps, Airvessels, Hydraulic ram, efficiency parameters, Rotary and positive displacement pumps, diaphragm and jet pumps.
Hydraulic turbines, types classification, Choice of turbines, performance parameters, controls, characteristics, specific speed.
Principles of hydropower development. Type, layouts and Component works. Surge tanks, types and choice. Flow duration curves and dependable flow. Storage an pondage. Pumped storage plants. Special features of mini, micro-hydel plants.

Part-D

GEO TECHNICAL ENGINEERING

Types of soil, phase relationships, consistency limits particles size distribution, classifications of soil, structure and clay mineralogy.
Capillary water and structural water, effective stress and pore water pressure, Darcy's Law, factors affecting permeability, determination of permeability, permeability of stratified soil deposits.
Seepage pressure, quick sand condition, compressibility and consolidation, Terzaghi's theory of one dimensional consolidation, consolidation test.
Compaction of soil, field control of compaction. Total stress and effective stress parameters, pore pressure coefficients.
Shear strength of soils, Mohr Coulomb failure theory, Shear tests.
Earth pressure at rest, acive and passive pressures, Rankine's theory, Coulomb's wedge theory, earth pressure on retaining wall, sheetpile walls, Braced excavation.
Bearing capacity, Terzaghi and other important theories, net and gross bearing pressure.
Immediate and consolidation settlement.
Stability of slope, Total Stress and Effective Stress methods, Conventional methods of slices, stability number.
Subsurface exploration, methods of boring, sampling, penetration tests, pressure meter tests.
Essential features of foundation, types of foundation, design criteria, choice of type of foundation, stress distribution in soils, Boussinessq's theory, Newmarks's chart, pressure bulb, contact pressure, applicability of different bearing capacity theories, evaluation of bearing capacity from field tests, allowable bearing capacity, Settlement analysis, allowable settlement.
Proportioning of footing, isolated and combined footings, rafts, buoyancy rafts, Pile foundation, types of piles, pile capacity, static and dynamic analysis, design of pile groups, pile load test, settlement of piles, lateral capacity. Foundation for Bridges. Ground improvement techniques-preloading, sand drains, stone column, grouting, soil stabilisation.

PAPER-II

Part-A

CONSTRUCTION TECHNOLOGY, EQUIPMENT, PLANNING AND MANAGEMENT

1. Construction Technology :

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Engineering Materials :

Physical properties of construction materials : Stones, Bricks and Tiles; Lime, Cement and Surkhi Mortars; Lime Concrete and Cement Concrete, Properties of freshly mixed and hardened concrete, Flooring Tiles, use of ferrocement, fibre-reinforced and polymer concrete, high strength concrete and light weight concrete. Timber : Properties and uses; defects in timber; seasoning and preservation of timber. Plastics, rubber and damp-proofing materials, termite proofing, Materials, for Low cost housing.

Construction :

Building components and their functions; Brick masonry : Bonds, jointing. Stone masonry. Design of Brick masonry walls as per I.S. codes, factors of safety, serviceability and strength requirements; plastering, pointing. Types of Floors & Roofs. Ventilators, Repairs in buildings.

Functional planning of building : Building orientation, circulation, grouping of areas, privacy concept and design of energy efficient building; provisions of National Building Code.

Building estimates and specifications; Cost of works; valuation.

2. Construction Equipment :

Standard and special types of equipment, Preventive maintenance and repair, factors affecting the selection of equipment, economical life, time and motion study, capital and maintenance cost.

Concreting equipments : Weigh batcher, mixer, vibration, batching plant, Concrete pump.

Earth-work equipment : Power shovel hoe, bulldozer, dumper, trailors, and tractors, rollers, sheep foot roller.

3. Construction Planning and Management : Construction activity, schedules, job layout, bar charts, organization of contracting firms, project control and supervision. Cost reduction measures.

New-work analysis : CPM and PERT analysis, Float Times, cashing of activities, contraction of network for cost optimization, updating, Cost analysis and resource allocation.

Elements of Engineering Economics, methods of appraisal, present worth, annual cost, benefit-cost, incremental analysis. Economy of scale and size. Choosing between alternatives including levels of investments. Project profitability.

Part-B

SURVEY AND TRANSPORTATION ENGINEERING

Survey : Common methods of distance and angle measurements, plane table survey, leveling traverse survey, triangulation survey, corrections, and adjustments, contouring, topographical map. Surveying instruments for above purposes. Tacheometry. Circular and transition curves. Principles of photo-grammetry.

Railways : Permanent way, sleepers, rail fastenings, ballast, points and crossings, design of turn outs, stations and yards, turntables, signals, and interlocking, level-crossing. Construction and maintenance of permanent ways : Super-elevation, creep of rail, ruling gradient, track resistance, tractive effort, relaying of track.

Highway Engineering : Principles of highway planning, Highway alignments. Geometrical design : Cross section, camber, super-elevation, horizontal and vertical curves. Classification of roads : low cost roads, flexible pavements, rigid pavements. Design of pavements and their construction, evaluation of pavement failure and strengthening.

Drainage of roads : Surface and sub-surface drainage.

Traffic Engineering : Forecasting techniques origin and destination survey, highway capacity. Channelised and unchannelised intersections, rotary design elements, markings, sign, signals, street lighting; Traffic surveys. Principle of highway financing.

Part-c :

HYDROLOGY, WATER RESOURCES AND ENGINEERING :

Hydrology : Hydrological cycle, precipitation, evaporation, transpiration, depression storage, infiltration, overland flow, hydrograph, flood frequency analysis, flood estimation, flood routing through a reservoir, channel flow routing-Muskingam method.

Ground water flow : Specific yield, storage coefficient, coefficient of permeability, confined and unconfined aquifers, aquitards, radial flow into a well under confined and unconfined conditions, tube wells, pumping and recuperation tests, ground water potential.

WATER RESOURCES ENGINEERING : Ground and surface water resource, single and multipurpose projects, storage capacity of reservoirs, reservoir losses, reservoir sedimentation, economics of water resources projects.

IRRIGATION ENGINEERING : Water requirements of crops : consumptive use, quality of water for irrigation, duty and delta, irrigation methods and their efficiencies.

Canals : Distribution systems for canal irrigation, canal capacity, canal losses, alignment of main and distributory canals, most efficient section, lined canals, their design, regime theory, critical shear stress, bed load, local and suspended load transport, cost analysis of lined and unlined canals, drainage behind lining.

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Water logging : causes and control, drainage system design, salinity.
Canal structures : Design of cross regulators, head regulators, canal falls, aqueducts, metering flumes and canal outlets.
Diversion head work : Principles and design of weirs of permeable and impermeable foundation, Khosla's theory, energy dissipation, stilling basin, sediment excluders.
Storage works : Types of dams, design, principles of rigid gravity and earth dams, stability analysis, foundation treatment, joints and galleries, control of seepage.
Spillways : Spillway types, crest gates, energy dissipation.
River training : Objectives of river training, methods of river training.

Part-D

ENVIRONMENTAL ENGINEERING

Water Supply : Estimation of surface and subsurface water resources, predicting demand for water, impurities, of water and their significance, physical, chemical and bacteriological analysis, waterborne diseases, standards for potable water.
Intake of water : pumping and gravity schemes. Water treatment : principles of coagulation, flocculation and sedimentation; slow-; rapid-, pressure-, filters; chlorination, softening, removal of taste, odour and salinity.
Water storage and distribution : storage and balancing reservoirs : types, location and capacity. Distribution system : layout, hydraulics of pipe lines, pipe fittings, valves including check and pressure reducing valves, meters, analysis of distribution systems, leak detection, maintenance of distribution systems, pumping stations and their operations.
Sewage systems : Domestic and industrial wastes, storm sewage-separate and combined systems, flow through sewers, design of sewers, sewer appurtenances, manholes, inlets, junctions, siphon. Plumbing in public buildings.
Sewage characterization : BOD, COD, solids, dissolved oxygen, nitrogen and TOC. Standards of disposal in normal water course and on land.
Sewage treatment : Working principles, units, chambers, sedimentation tanks, trickling filters, oxidation ponds, activated sludge process, septic tank, disposal of sludge, recycling of waste water.
Solid waste : collection and disposal in rural and urban contexts, management of long-term ill-effects.
Environmental pollution : Sustainable development. Radioactive wastes and disposal. Environmental impact assessment for thermal power plants, mines, river valley projects. Air pollution. Pollution control acts.

FORESTRY
PAPER-I
Section A

1. Silviculture - General :
General Silvicultural Principles : ecological and physiological factors influencing vegetation, natural and artificial regeneration of forests; methods of propagation, grafting techniques; site factors; nursery and planting techniques-nursery beds, polybags and maintenance, water budgeting, grading and hardening of seedlings; special approaches; establishment and tending.
2. Silviculture - systems :
Clear felling, uniform shelter wood selection, coppice and conversion systems. Management of silviculture systems of temperate, subtropical, humid tropical, dry tropical and coastal tropical forests with special reference to plantation silviculture, choice of species, establishment and management of standards, enrichment methods, technical constraints, intensive mechanized methods, aerial seeding thinning.
3. Silviculture - Mangrove and Cold desert :
Mangrove : habitat and characteristics, mangrove, plantation-establishment and rehabilitation of degraded mangrove formations; silvicultural systems for mangrove; protection of habitats against natural disasters.
Cold desert - Characteristics, identification and management of species.
4. Silviculture of trees :
Traditional and recent advances in tropical silvicultural research and practices. Silviculture of some of the economically important species in India such as *Acacia catechu, Acacia nilotica, Acacia auriculiformis, Albizzia lebbeck, Albizzia procera, Anthocephalus Cadamba, Anogeissus latifolia, Azadirachta indica, Bamboo spp, Butea monosperma, Cassia siamea,Casuarina equisetifolia, Cedrus deodara, Chukrasia tabularis, Dalbergia sisoo, Dipterocarpus spp., Emblica officindils, Eucalyptus spp, Gmelina Arborea, Hardwickia binata, Largerstroemia Lanceolata, Pinus roxburghi, Populus spp, Pterocarpus marsupium, Prosopis juliflora, Santalum album, Semecarpus anacardium,. Shorea robusta, Salmalia malabaricum, Tectona grandis, Terminalis tomemtosa, Tamarindus indica.*

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Section B

1. Agroforestry, Social Forestry, Joint Forest Management and Tribology :

Agroforestry - scope and necessity; role in the life of people and domestic animals and in integrated land use, planning especially related to (i) soil and water conservation; (ii) water recharge; (iii) nutrient availability to crops; (iv) nature and ecosystem preservation including ecological balances through pest-predator relationships and (v) providing opportunities for enhancing bio-diversity, medicinal and other flora and fauna. Agro forestry systems under different agro-ecological zones; selection of species and role of multipurpose trees and NTFPs, techniques, food, fodder and fuel security. Research and Extension needs.

Social/Urban Forestry : objectives, scope and necessity; peoples participation.

JFM - principles, objectives, methodology, scope, benefits and role of NGOs.

Tribology - tribal scene in India; tribes, concept of races, principles of social grouping, stages of tribal economy, education, cultural tradition, customs, ethos and participation in forestry programmes.

2. Forest Soils, Soil Conservation and Watershed management :

Forests Soils: classification, factors affecting soil formation; physical, chemical and biological properties.

Soil conservation - definition, causes for erosion; types - wind and water erosion; conservation and management of eroded soils/areas, wind breaks, shelter belts; sand dunes; reclamation of saline and alkaline soils, water logged and other waste lands. Role of forests in conserving soils. Maintenance and build up of soil organic matter, provision of loppings for green leaf manuring; forest leaf litter and composting; Role of microorganisms in ameliorating soils; N and C cycles, VAM.

Watershed Management - concepts of watershed; role of mini-forests and forest trees in overall resource management, forest hydrology, watershed development in respect of torrent control, river channel stabilization, avalanche and landslide controls, rehabilitation of degraded areas; hilly and mountain areas; watershed management and environmental functions of forests; water-harvesting and conservation; ground water recharge and watershed management; role of integrating forest trees, horticultural crops, field crops, grass and fodders.

3. Environmental Conservation and Biodiversity :

Environment; components and importance, principles of conservation, impact of deforestation; forest fires and various human activities like mining, construction and developmental projects, population growth on environment.

Pollution - types, global warming, green house effects, ozone layer depletion, acid rain, impact and control measures, environmental monitoring; concept of sustainable development. Role of trees and forests in environmental conservation; control and prevention of air, water and noise pollution. Environmental policy and legislation in India. Environmental Impact Assessment. Economics assessment of watershed development vis-a-vis ecological and environmental protection.

4. Tree Improvement and Seed Technology :

General concept of tree improvement, methods and techniques, variation and its use, provenance, seed source, exotics; quantitative aspects of forest tree improvement, seed production and seed orchards, progeny tests, use of tree improvement in natural forest and stand improvement, genetic testing programming, selection and breeding for resistance to diseases, insects, and adverse environment; the genetic base, forest genetic resources and gene conservation in situ and ex-situ. Cost benefit ratio, economic evaluation.

PAPER II

Section A

1. Forest Management and Management Systems :

Objective and principles; techniques; stand structure and dynamics, sustained yield relation; rotation, normal forest, growing stock; regulation of yield; management of forest plantations, commercial forests, forest cover monitoring. Approaches viz., (i) site-specific planning, (ii) strategic planning, (iii) Approval, sanction and expenditure, (iv) Monitoring (v) Reporting and governance. Details of steps involved such as formation of Village Forest Committees, Joint Forest Participatory Management.

2. Forest Working Plan :

Forest planning, evaluation and monitoring tools and approaches for integrated planning; multipurpose development of forest resources and forest industries development; working plans and working schemes, their role in nature conservation, bio-diversity and other dimensions; preparation and control. Divisional Working Plans, Annual Plan of Operations.

3. Forest Mensuration and Remote Sensing :

Methods of measuring - diameter, girth, height and volume of trees; form-factor; volume estimation of stand, current annual increment; mean annual increment. Sampling methods

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and sample plots. Yield calculation; yield and stand tables, forest cover monitoring through remote
sensing; Geographic Information Systems for management and modeling.

4. Surveying and Forest Engineering :

Forest surveying - different methods of surveying, maps and map reading. Basic principles of forest engineering. Building materials and construction. Roads and Bridges; General principles, objects, types, simple design and construction of timber bridges.

Section B

1. Forest Ecology and Ethnobotany :

Forest ecology - Biotic and aboitic components, forest eco-systems; forest community concepts; vegetation concepts, ecological succession and climax, primary productivity, nutrient cycling and water relations; physiology in stress environments (drought, water logging salinity and alkalinity). Forest types in India, identification of species, composition and associations; dendrology, taxonomic classification, principles and establishment of herbaria and arboreta. Conservation of forest ecosystems. Clonal parks, Role of **Ethnobotany** in Indian Systems of Medicine; Ayurveda and Unani - Introduction, nomenclature, habitat, distribution and botanical features of medicinal and aromatic plants. Factors affecting action and toxicity of drug plants and their chemical constituents.

2. Forest Resources and Utilization : Environmentally sound forest harvesting practices; logging and extraction techniques and principles, transportation system, storage and sale; Non-Timber Forest Products (NTFPs) definition and scope; gums, resins, oleoresins, fibres, oil seeds nuts, rubber, canes, bamboos, medicinal plants, charcoal, lac and shellac, Katha and Bidi leaves, collection; processing and disposal.

Need and importance of wood seasoning and preservation; general principles of seasoning, air and kiln seasoning, solar dehumidification, steam heated and electrical kilns. Composite wood; adhesives-manufacture, properties, uses, plywood manufacture-properties, uses, fibre boards-manufacture properties, uses; particle boards manufacture; properties uses. Present status of composite wood industry in India in future expansion plans. Pulp-paper and rayon; present position of supply of raw material to industry, wood substitution, utilization of plantation wood; problems and possibilities.

Anatomical structure of wood, defects and abnormalities of wood, timber identification - general principles.

3. Forest Protection & Wildlife Biology :

Injuries to forest - abiotic and biotic, destructive agencies, insect-pests and disease, effects of air pollution on forests and forest die back. Susceptibility of forests to damage, nature of damage, cause, prevention, protective measures and benefits due to chemical and biological control. General forest protection against fire, equipment and methods, controlled use of fire, economic and environmental costs; timber salvage operations after natural disasters. Role of afforestation and forest regeneration in absorption of CO2. Rotational and controlled grazing, different methods of control against grazing and browsing animals; effect of wild animals on forest regeneration, human impacts; encroachment, poaching, grazing, live fencing, theft, shifting cultivation and control.

4. Forest Economics and Legislation :

Forest economics: fundamental principles, cost-benefit analyses; estimation of demand and supply; analysis of trends in the national and international market and changes in production and consumption patterns; assessment and projection of market structures; role of private sector and co-operatives; role of corporate financing. Socio-economic analyses of forest productivity and attitudes; valuation of forest goods and service.

Legislation-History of forest development; Indian Forest Policy of 1894, 1952 and 1990. National Forest Policy, 1988 of People's involvement, Joint Forest Management, Involvement of women; Forestry Policies and issues related to land use, timber and non-timber products, sustainable forest management; industrialization policies; institutional and structural changes. Decentralization and Forestry Public Administration. Forest laws, necessity; general principles, Indian Forest Act 1927; Forest Conservation Act, 1980; Wildlife Protection Act 1972 and their amendments; Application of Indian Penal Code to Forestry. Scope and objectives of Forest nventory.

GEOLOGY

PAPER I

Section-A

(i) General Geology

The Solar System, meteorities, origin and interior of the earth. Radioactivity and age of earth; Volcanoes- causes and products, volcanic belts. Earthquakes-causes, effects, earthquake belts, seismicity of India, intensity and magnitude, seismongraphs. Island arcs, deep sea

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trenches and mid-ocean ridges. Continental driftevidences and mechanics; seafloor spreading, plate tectonics. Isostasy, orogeny and epeirogeny. Continents and oceans.

(ii) Geomorphology and Remote Sensing

Basic concepts of geomorphology. Weathering and mass wasting. Landforms, slopes and drainage. Geomorphic cycles and their interpretation. Morphology and its relation to structures and lithology. Applications of geomorphology in mineral prospecting, civil engineering, hydrology and environmental studies. Geomorphology of Indian subcontinent.

Aerial photographs and their interpretation-merits and limitations. The Electron-magnetic Spectrum. Orbiting satellites and sensor systems. Indian Remote Sensing Satellites. Satellites data products. Applications of remote sensing in geology. The Geographic Information System and its applications. Global Positioning System.

(iii) Structural geology

Principles of geologic mapping and map reading, projection diagrams, stress and strain ellipsoid and stress-strain relationships of elastic, plastic and viscous materials. Strain markers in deformed rocks. Behaviour of minerals and rocks under deformation conditions. Folds and faults classification and mechanics. Structural analysis of folds, foliations, lineations, joints and faults, unconformities. Superposed deformation. Time-relationship between crystallization and deformation. Introduction to petro-fabrics.

Section-B

(iv) Paleontology

Species- definition and nomenclature. Megafossils and Microfossils. Modes of preservation of fossils. Different kinds of microfossils. Application of microfossils in correlation, petroleum exploration, paleoclimatic and paleoceanographic studies. Morphology, geological history and evolutionary trend in Cephalopoda, Trilobita, Brachiopoda, Echinoidea and Anthozoa. Stratigraphic utility of Ammonoidea, Trilobita and Graptoloidea. Evolutionary trend in Hominidae, Equidae and Proboscidae. Siwalik fauna. Gondwana flora and its importance.

(v) Stratigraphy and Geology of India

Classification of stratigraphic sequences: litho-stratigraphic, biostratigraphic, chronostratigraphic and magneto-stratigraphic and their interrelationships. Distribution and classification of Precambrian rocks of India. Study of stratigraphic distribution and lithology of Phanerozoic rocks of India with reference to fauna, flora and economic importance. Major boundary problems- Cambrian/Precambrian, Permian/Triassic, Cretaceous/Tertiary and Pliocene/Pleistocene. Study of climatic conditions, paleogeography and igneous activity in the Indian subcontinent in the geological past. Tectonic framework of India. Evolution of the Himalayas.

(vi) Hydrogeology and Engineering Geology : Hydrologic cycle and genetic classification of water. Movement of subsurface water. Springs. Porosity, permeability, hydraulic conductivity, transmissivity and storage coefficient, classification of aquifers. Water-bearing characteristics of rocks. Groundwater chemistry. Salt water intrusion. Types of wells. Drainage basin morphometry. Exploration for groundwater. Groundwater recharge. Problems and management of groundwater. Rainwater harvesting. Engineering properties of rocks. Geological investigations for dams, tunnels and bridges. Rock as construction material. Alkali-aggregate reaction. Landslides-causes, prevention and rehabilitation. Earthquake-resistant structures.

Paper-II

Section-A

(i) Mineralogy

Classification of crystals into systems and classes of symmetry. International system of crystallographic notation. Use of projection diagrams to represent crystal symmetry. Crystal defects. Elements of X-ray crystallography.

Petrological microscope and accessories. Optical properties of common rock forming minerals. Pleochroism, extinction angle, double refraction, birefringence, twinning and dispersion in minerals.

Physical and chemical characters of rock forming slilicate mineral groups. Structural classification of silicates. Common minerals of igneous and metamorphic rocks. Minerals of the carbonate, phosphate, sulphide and halide groups.

(ii) Igneous ad Metamorphic Petrology :

Generation and crystallisation of magma. Crystallisation of albite-anorthite, diopside-anorthite and diopside-wollastonite-silica systems. Reaction principle. Magmatic differentation and assimilation. Petrogenetic significance of the textures and structrues of igneous rocks. Petrography and petrogenesis of granite, syenite, diorite, basic and ultrabasic groups, charnockite, anorthosite and alkaline rocks. Carbonatites. Deccan volcanic province.

Types and agents of metamporphism. Metamporphic grades and zones. Phase rule. Facies of regional and contact metamorphism. ACF and AKF diagrams. Textures and structures of

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metamporphic rocks. Metamorphism of arenaceous, argillaceous and basic rocks. Minerals assemblages Retrograde metamorphism. Metasomatism and granitisation, migmatites, Granulite terrains of India.

(iii) Sedimentology

Sedimentary rocks: Processes of formation, diagenesis and lithification. Properties of sediments. Clastic and non-clastic rocks-their classification, petrography and depositional environment. Sedimentary facies and provenance. Sedimentary structures and their significance. Heavy minerals and their significance. Sedminetary basins of India.

Section-B

(iv) Economic Geology

Ore, ore minerals and gangue, tenor of ore, classification of ore deposits. Process of formation of minerals deposits. Controls of ore localisation. Ore textures and structures. Metallogenic epochs and provinces. Geology of the important Indian deposits of aluminium, chromium, copper, gold, iron, lead zinc, manganese, titanium, uranium and thorium and industrial minerals. Deposits of coal and petroleum in India. National Mineral Policy. Conservation and utilization of mineral resources. Marine mineral resources and Law of Sea.

(v) Mining Geology

Methods of prospecting-geological, geophysical, geochemical and geobotanical. Techniques of sampling. Estimation of reserves or ore. Mehtods of exploration and mining metallic ores, industrial minerals and marine mineral resources. Mineral beneficiation and ore dressing.

(vi) Geochemistry and Environmental Geology

Cosmic abundance of elements. Composition of the planets and meteorites. Structure and composition of earth and distribution of elements. Trace elements. Elements of crystal chemistry-types of chemical bonds, coordination number. Isolmorphism and polymorphism. Elementary thermodynamics. Natural hazards-floods, landslides, coastal erosion, earthquakes and volcanic activity and mitigation. Environmental impact of urbanization, open cast mining, industrial and radioactive waste disposal, use of fertilizers, dumping of mine waste and fly-ash.

Pollution of ground and surface water, marine pollution Environment protection legislative measures in India.

Mathematics

Paper-I

Section-A

Linear Algebra

Vector, space, linear dependence and independence, subspaces, bases, dimensions. Finite dimensional vector spaces.

Matrices, Cayley-Hamiliton theorem, Eigen values and Eigenvectors, matrix of linear transformation, row and column reduction, Echelon form, equivalence, congruence and similarity, reduction to canonical form, rank, orthogonal, symmetrical, skew symmetrical, unitary, hermitian, skew-hermitian forms their Eigen values. Orthogonal and unitary reduction of quadratic and hermitian forms, positive definite quadratic forms.

Calculus

Real numbers, limits, continuity, differentiability, mean-value theorems, Taylor's theorem with remainders, indeterminate forms, maxima and minima, asymptotes. Functions of several variables: continuity, differentiability, partial derivatives, maxima and minima, Lagrange's method of multipliers, Jacobian. Riemann's definition of definite integrals, indefinite integrals, infinite and improper integrals, beta and gamma functions. Double and triple integrals (evaluation techniques only). Areas, surface and volumes, centre of gravity.

Analytic Geometry :

Cartesian and polar coordinates in two and three dimensions, second degree equations in two and three dimensions, reduction to canonical forms, straight lines, shortest distance between two skew lines, plane, sphere, cone, cylinder, paraboloid, ellipsoid, hyperboloid of one and two sheets and their properties.

Section-B

Ordinary Differential Equations :

Formulation of differential equations, order and degree, equations of first order and first degree, integrating factor, equations of first order but not of first degree, Clariaut's equation, singular solution. Higher order linear equations, with constant coefficients, complementary function and particular integral, general solution, Euler-Cauchy equation.

Second order linear equations with variable coefficients, determination of complete solution when one solution is known, method of variation of parameters.

Dynamics, Statics and Hydrostatics :

Degree of freedom and constraints, rectilinear motion, simple harmonic motion, motion in a plane, projectiles, constrained motion, work and energy, conservation of energy, motion under

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impulsive forces, Kepler's laws, orbits under central forces, motion of varying mass, motion under resistance.

Equilibrium of a system of particles, work and potential energy, friction, common catenary, principle of virtual work, stability of equilibrium, equilibrium of forces in three dimensions.

Pressure of heavy fluids, equilibrium of fluids under given system of forces Bernoulli's equation, centre of pressure, thrust on curved surfaces, equilibrium of floating bodies, stability of equilibrium, metacentre, pressure of gases.

Vector Analysis :

Scalar and vector fields, triple, products, differentiation of vector function of a scalar variable, gradient, divergence and curl in cartesian, cylindrical and spherical coordinates and their physical interpretations. Higher order derivatives, vector identities and vector equations.

Application to Geometry: Curves in space, curvature and torsion. Serret-Frenet's formulae, Gauss and Stokes' theorems, Green's identities.

Paper-II

Section-A

Algebra:

Groups, subgroups, normal subgroups, homomorphism of groups quotient groups basic isomorphism theorems, Sylow's group, permutation groups, Cayley theorem. Rings and ideals, principal ideal domains, unique factorization domains and Euclidean domains. Field extensions, finite fields.

Real Analysis :

Real number system, ordered sets, bounds, ordered field, real number system as an ordered field with least upper bound property, Cauchy sequence, completeness, Continuity and uniform continuity of functions, properties of continuous functions on compact sets. Riemann integral, improper integrals, absolute and conditional convergence of series of real and complex terms, rearrangement of series. Uniform convergence, continuity, differentiability and integrability for sequences and series of functions. Differentiation of functions of several variables, change in the order of partial derivatives, implicit function theorem, maxima and minima. Multiple integrals.

Complex Analysis :

Analytic function, Cauchy-Riemann equations, Cauchy's theorem, Cauchy's integral formula, power series, Taylor's series, Laurent's Series, Singularities, Cauchy's residue theorem, contour integration. Conformal mapping, bilinear transformations.

Linear Programming :

Linear programming problems, basic solution, basic feasible solution and optimal solution, graphical method and Simplex method of solutions. Duality. Transportation and assignment problems. Travelling salesman problems.

Section-B

Partial differential equations:

Curves and surfaces in three dimensions, formulation of partial differential equations, solutions of equations of type dx/p=dy/q=dz/r; orthogonal trajectories, Pfaffian differential equations; partial differential equations of the first order, solution by Cauchy's method of characteristics; Charpit's method of solutions, linear partial differential equations of the second order with constant coefficients, equations of vibrating string, heat equation, laplace equation.

Numerical Analysis and Computer programming:

Numerical methods: Solution of algebraic and transcendental equations of one variable by bisection, Regula-Falsi and Newton-Raphson methods, solution of system of linear equations by Gaussian elimination and Gauss-Jordan (direct) methods, Gauss-Seidel(iterative) method. Newton's (Forward and backward) and Lagrange's method of interpolation.

Numerical integration: Simpson's one-third rule, trapezoidal rule, Gaussian quadrature formula.

Numerical solution of ordinary differential equations: Euler and Runge Kutta-methods.

Computer Programming: Storage of numbers in Computers, bits, bytes and words, binary system. arithmetic and logical operations on numbers. Bitwise operations. AND, OR , XOR, NOT, and shift/rotate operators. Octal and Hexadecimal Systems. Conversion to and Form decimal Systems.

Representation of unsigned integers, signed integers and reals, double precision reals and long integers.

Algorithms and flow charts for solving numerical analysis problems.

Developing simple programs in Basic for problems involving techniques covered in the numerical analysis.

Mechanics and Fluid Dynamics :

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Generalised coordinates, constraints, holonomic and non-holonomic, systems. D'Alembert's principle and Lagrange' equations, Hamilton equations, moment of intertia, motion of rigid bodies in two dimensions.

Equation of continuity, Euler's equation of motion for inviscid flow, stream-lines, path of a particle, potential flow, two-dimensional and axisymetric motion, sources and sinks, vortex motion, flow past a cylinder and a sphere, method of images. Navier-Stokes equation for a viscous fluid.

Mechanical Engineering

Paper I

1. Theory of Machines

Kinematic and dynamic analysis of planar mechanisms. Cams, Gears and gear trains, Flywheels, Governors, Balancing of rigid rotors, Balancing of single and multicylinder engines, Linear vibration analysis of mechanical systems (single degree and two degrees of freedom), Critical speeds and whirling of shafts, Automatic Controls, Belts and chain drives. Hydrodynamic bearings.

2. Mechanics of Solids :

Stress and strain in two dimensions. Principal stresses and strains, Mohr's construction, linear elastic materials, isotropy and an isotropy, Stress-strain relations, uniaxial loading, thermal stresses. Beams : Banding moment and shear force diagrams, bending stresses and deflection of beams, Shear stress distribution. Torsion of shafts, helical springs. Combined stresses, Thick and thin walled pressure vessels. Struts and columns, Strain energy concepts and theories of failure. Rotation discs. Shrink fits.

3. Engineering Materials :

Basic concepts on structure of solids, Crystalline materials, Defects in crystalline materials, Alloys and binary phase diagrams, structure and properties of common engineering materials. Heat treatment of steels. Plastics, Ceramics and composite Materials, common applications of various materials.

4. Manufacturing Science :

Marchant's force analysis, Taylor's tool life equation, machinability and machining economics, Rigid, small and flexible automation, NC, CNC. Recent machining methods- EDM, ECM and ultrasonics. Application of lasers and plasmas, analysis of forming processes. High energy rate forming. Jigs, fixtures, tools and gauges, Inspection of length, position, profile and surface finish.

5. MANUFACTURING MANAGEMENT :

Production Planning and Control, Forecasting-Moving average, exponential smoothing, Operations sheduling; assembly line balancing. Product development. Breakeven analysis, Capacity planning. PERT and CPM.

Control Operations : Inventory control-ABC analysis. EOQ model. Materials requirement planning. Job design, Job standards, work measurement, Quality management-Quality control. Operations Research : Linear programming-Graphical and Simplex methods. Transportation and assignment models. Single server queuing model.

Value Engineering : Value analysis, for cost/value. Total quality management and forecasting techniques. Project management.

6. ELEMENTS OF COMPUTATION :

Computer Organisation, Flow charting. Features of Common Computer Languages-FORTRAN d Base III, Lotus 1-2-3 C and elementary programming.

PAPER-II

1. THERMODYNAMICS :

Basic concept. Open and closed systems, Applications of Thermodynamic Laws, Gas equations, Clapeyron equation, Availability, Irreversibility and Tds relations.

2. I.C. Engines, Fuels and Combustion :

Spark Ignition and compression ignition engines, Four stroke engine and Two stroke engines, mechanical, thermal and volumetric efficiency, Heat balance.

Combustion process in S.I. and C.I. engines, pre-ignition detonation in S.I. engine Diesel knock in C.I. engine. Choice of engine fuels, Octane and Cetane ratings. Alternate fuels Carburration and Fuel injection, Engine emissions and control. Solid, liquid and gaseous fuels, stoichometric air requirements and excess air factor, fuel gas analysis, higher and lower calorific values and their measurements.

3. HEAT TRANSFER, REFRIGERATION AND AIR CONDITIONING :

One and two dimensional heat conduction. Heat transfer from extended surfaces, heat transfer by forced and free convection. Heat exchangers. Fundamentals for diffusive and connective mass transfer, Radiation laws, heat exchange between black and non black surfaces, Network Analysis. Heat pump refrigeration cycles and systems, Condensers, evaporators and expansion

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devices and controls. Properties and choice of refrigerant, Refrigeration Systems and components, psychometrics, comfort indices, cooling loading calculations, solar refrigeration.

4. TURBO-MACHINES AND POWER PLANTS :

Continuity, momentum and Energy Equations. Adiabatic and Isentropic flow, Fanno lines, Raylegh lines. Theory and design of axial flow turbines and compressors, Flow through turbo-machine blade, cascades, centrifugal compressor. Dimensional analysis and modelling. Selection of site for steam, hydro, nuclear and stand-by power plants, selection base and peak load power plants Modern High pressure, High duty boilers, Draft and dust removal equipment, Fuel and cooling water systems, heat balance, station and plant heat rates, operation and maintenance of various power plants, preventive maintenance, economics of power generation.

Physics
Paper I
Section-A

1. Classical Mechanics

(a) Particle dynamics:

Centre of mass and laboratory coordinates conservation of linear and angular momentum. The rocket equation. Rutherford scattering, Galilean transformation, inertial and non-inertial frames, rotating frames, centrifugal and Coriolis forces, Foucault pendulum.

(b) System of particles:

Constraints, degrees of freedom, generalized coordinates and moments. Lagrange's equation and applications to linear harmonic oscillator, simple pendulum and central force problems. Cyclic coordinates, Hamiltonian Lagrange's equation from Hamilton's principle.

(c) Rigid body dynamics:

Eulerian angles, inertia tensor, principal moments of inertia. Euler's equation of motion of a rigid body, force-free motion of a rigid body, Gyroscope.

2. Special Relativity, Waves & Geometrical Optics

(a) Special Relativity:

Michelson-Morley experiment and its implications. Lorentz transformations-length contraction, time dilation, addition of velocities, aberration and Doppler effect, mass-energy relation, simple applications to a decay process. Minkowski diagram, four dimensional momentum vector. Covariance of equations of physics.

(b) Waves:

Simple harmonic motion, damped oscillation, forced oscillation and resonance. Beats. Stationary waves in a string. Pulses and wave packets. Phase and group velocities. Reflection and Refraction from Huygens' principle.

(c) Geometrical Optics:

Laws of reflection and refraction from Fermat's principle. Matrix method in paraxial optic-thin lens formula, nodal planes, system of two thin lenses, chromatic and spherical aberrations.

3. Physical Optics:

(a) Interference:

Interference of light-Young's experiment, Newton's rings, interference by thin films, Michelson interferometer. Multiple beam interference and Fabry-Perot interferometer.
Holography and simple applications.

(b) Diffraction:

Fraunhofer diffraction-single slit, double slit, diffraction grating, resolving power. Fresnel diffraction: - half-period zones and zones plates. Fresnel integrals. Application of Cornu's spiral to the analysis of diffraction at a straight edge and by a long narrow slit. Diffraction by a circular aperture and the Airy pattern.

(c) Polarisation and Modern Optics:

Production and detection of linearly and circularly polarised light. Double refraction, quarter wave plate. Optical activity. Principles of fibre optics attenuation; pulse dispersion in step index and parabolic index fibres; material dispersion, single mode fibres. Lasers-Einstein A and B coefficients. Ruby and He-Ne lasers. Characteristics of laser light-spatial and temporal coherence. Focussing of laser beams. Three-level scheme for laser operation.

Section-B

4. Electricity and Magnetism:

(a) Electrostatics and Magnetostatics:

Laplace and Poisson equations in electrostatics and their applications. Energy of a system of charges, multiple expansion of scalar potential. Method of images and its applications. Potential and field due to a dipole, force and torque on a dipole in an external field. Dielectrics, polarisation. Solutions to boundary-value problems-conducting and dielectric spheres in a uniform electric field. Magnetic shell, uniformly magnetized sphere. Ferromagnetic materials, hysteresis, energy loss.

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(b) Current Electricity:

Kirchhoff's laws and their applications. Biot-Savart law, Ampere's law, Faraday's law, Lenz' law. Self-and mutual-inductances. Mean and r.m.s. values in AC circuits. LR CR and LCR circuits-series and parallel resonance. Quality factor. Principal of transformer.

5. Electromagnetic Theory & Black Body Radiation:

(a) Electromagnetic Theory:

Displacement current and Maxwell's equations. Wave equations in vacuum, Pointing theorem. Vector and scalar potentials. Gauge invariance, Lorentz and Coulomb gauges. Electromagnetic field tensor, covariance of Maxwell's equations. Wave equations in isotropic dielectrics, reflection and refraction at the boundary of two dielectrics. Fresnel's relations. Normal and anomalous dispersion. Rayleigh scattering.

(b) Blackbody radiation:

Balckbody radiation ad Planck radiation law-Stefan-Boltzmann law, Wien displacement law and Rayleigh-Jeans law. Planck mass, Planck length, Planck time,. Planck temperature and Planck energy.

6. Thermal and Statistical Physics :

(a) Thremodynamics:

Laws of thermodynamics, reversible and irreversible processes, entropy. Isothermal, adiabatic, isobaric, isochoric processes and entropy change. Otto and Diesel engines, Gibbs' phase rule and chemical potential. van der Waals equation of state of a real gas, critical constants. Maxwell-Boltzman distribution of molecular velocities, transport phenomena, equipartition and virial theorems. Dulong-Petit, Einstein, and Debye's theories of specific heat of solids. Maxwell relations and applications. Clausius-Clapeyron equation. Adiabatic demagnetisation, Joule-Kelvin effect and liquefaction of gases.

(b) Statistical Physics:

Saha ionization formula. Bose-Einstein condensation. Thermodynamic behavior of an ideal Fermi gas, Chandrasekhar limit, elementary ideas about neutron stars and pulsars. Brownian motion as a random walk, diffusion process. Concept of negative temperatures.

Paper-II

Section-A

1. Quantum Mechanics I :

Wave-particle duality. Schroedinger equation and expectation values. Uncertainty principle. Solutions of the one-dimensional Schroedinger equation free particle (Gaussian wave-packet), particle in a box, particle in a finite well, linear harmonic oscillator. Reflection and transmission by a potential step and by a rectangular barrier. Use of WKB formula for the life-time calculation in the alpha-decay problem.

2. Quantum Mechanics II & Atomic Physics:

(a) Quantum Mechanics II:

Particle in a three dimensional box, density of states, free electron theory of metals. The angular momentum problem. The hydrogen atom. The spin half problem and properties of Pauli spin matrices.

(b) Atomic Physics:

Stern-Gerlack experiment, electron spin, fine structure of hydrogen atom. LS coupling, J-J coupling. Spectroscopic notation of atomic states. Zeeman effect. Frank-Condon principle and applications.

3. Molecular Physics:

Elementary theory of rotational, vibrational and electronic spectra of diatomic molecules. Raman effect and molecular structure. Laser Raman spectroscopy. Importance of neutral hydrogen atom, molecular hydrogen and molecular hydrogen ion in astronomy Fluorescence and Phosphorescence. Elementary theory and applications of NMR. Elementary ideas about Lamb shift and its significance.

Section-B

4. Nuclear Physics:

Basic nuclear properties-size, binding energy, angular momentum, parity, magnetic moment. Semi-empirical mass formula and applications. Mass parabolas. Ground state of a deuteron magnetic moment and non-central forces. Meson theory of nuclear forces. Salient features of nuclear forces. Shell model of the nucleus-success and limitations. Violation of parity in beta decay. Gamma decay and internal conversion. Elementary ideas about Mossbauer spectroscopy. Q-value of nuclear reactions. Nuclear fission and fusion, energy production in stars. Nuclear reactors.

5. Particle Physics & Solid State Physics:

(a) Particle Physics:

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Classification of elementary particles and their interactions. Conservation laws. Quark structure of hadrons. Field quanta of electroweak and strong interactions. Elementary ideas about Unification of Forces. Physics of neutrinos.

(b) Solid State Physics:

Cubic crystal structure. Band theory of solids-conductors, insulators and semi-conductors. Elements of superconductivity, Meissner effect, Josephson junctions and applications. Elementary ideas about high temperature superconductivity.

6. Electronics :

Intrinsic and extrinsic semi-conductors-p-n-p and n-p-n transistors. Amplifiers and oscillators. Op-amps. FET, JFET and MOSFET. Digital electronics-Boolean identities, De; Morgan's laws, Logic gates and truth tables, Simple logic circuits. Thermistors, solar cells. Fundamentals of microprocessors and digital computers.

Statistics
Paper-I

Probability :

Sample space and events, probability measure and probability space, random variable as a measurable function, distribution function of a random variable, discrete and continuous-type random variable probability mass function, probability density function, vector-valued random variable, marginal and conditional distributions, stochastic independence of events and of random variables, expectation and moments of a random variable, conditional expectation, convergence of a sequence of random variable in distribution, in probability, in p-th mean and almost everywhere, their criteria and inter-relations, Borel-Cantelli lemma, Chebyshev's and Khinchine's weak laws of large numbers, strong law of large numbers and Kolmogorov's theorems, Glivenko-Cantelli theorem, probability generating function, characteristic function, inversion theorem, Laplace transform, related uniqueness and continuity theorems, determination of distribution by its moments. Linderberg and Levy forms of central limit theorem, standard discrete and continuous probability distributions, their inter-relations and limiting cases, simple properties of finite Markov chains.

Statistical Inference:

Consistency, unbiasedness, efficiency, sufficiency, minimal sufficiency, complete-ness, ancillary statistic, factorization theorem, exponential family of distribution and its properties, uniformly minimum variance unbiased (UMVU) estimation, Rao-Blackwell and Lehmann-Scheffe theorems, Cramer-Rao inequality for single and several-parameter family of distributions, minimum variance bound estimator and its properties, modifications and extensions of Cramer-Rao inequality, Chapman-Robbins inequality, Bhattacharyya's bounds, estimation by methods of moments, maximum likelihood, least squares, minimum chi-square and modified minimum chi-square, properties of maximum likelihood and other estimators, idea of asymptotic efficiency, idea of prior and posterior distributions, Bayes' estimators.

Non-randomised and randomised tests, critical function, MP tests, Neyman-Pearson lemma, UMP tests, monotone likelihood ratio, generalised Neyman-Pearson lemma, similar and unbiased tests, UMPU tests for single and several-parameter families of distributions, likelihood rotates and its large sample properties, chi-square goodness of fit test and its asymptotic distribution.

Confidence bounds and its relation with tests, uniformly most accurate (UMA) and UMA unbiased confidence bounds.

Kolmogorov's test for goodness of fit and its consistency, sign test and its optimality. Wilcoxon signed-ranks test and its consistency, Kolmogorov-Smirnov two-sample test, run test, Wilcoxon-Mann-Whiltney test and median test, their consistency and asymptotic normality.

Wald's SPRT and its properties, OC and ASN functions, Wald's fundamental identity, sequential estimation.

Linear Inference and Multivariate Analysis :

Linear statistical models, theory of least squares and analysis of variance, Gauss-Markoff theory, normal equations, least squares estimates and their precision, test of significance and interval estimates based on least squares theory in one-way, two-way and three-way classified data, regression analysis, linear regression, curvilinear regression and orthogonal polynomials, multiple regression, multiple and partial correlations, regression diagnostics and sensitivity analysis, calibration problems, estimation of variance and covariance components, MINQUE theory, multivariate normal distribution, Mahalanobis D2 and Hotelling's T2 statistics and their applications and properties, discriminant analysis, canonical correlations, one-way MANOVA, principal component analysis, elements of factor analysis.

Sampling Theory and Design of Experiments:

An outline of fixed-population and super-population approaches, distinctive features of finite population sampling, probability sampling designs, simple random sampling with and without replacement, stratified random sampling, systematic sampling and its efficacy for structural

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populations, cluster sampling, two-stage and multi-stage sampling, ratio and regression, methods of estimation involving one or more auxiliary variables, two-phase sampling, probability proportional to size sampling with and without replacement, the Hansen-Hurwitz and the Horvitz-Thompson estimators, non-negative variance estimation with reference to the Horvitz-Thompson estimator, non-sampling errors, Warner's randomized response technique for sensitive characteristics.

Fixed effects model (two-way classification) random and mixed effects models (two-way classification per cell), CRD, RBD, LSD and their analyses, incomplete block designs, concepts of orthogonality and balance, BIBD, missing plot technique, factorial designs : 2n, 32 and 33, confounding in factorial experiments, split-plot and simple lattice designs.

PAPER-II

I. Industrial Statistics

Process and product control, general theory of control charts, different types of control charts for variables and attributes, X, R, s, p, np and c charts, cumulative sum chart, V-mask, single, double, multiple and sequential sampling plans for attributes, OC, ASN, AOQ and ATI curves, concepts of producer's and consumer's risks, AQL, LTPD and AOQL, sampling plans for variables, use of Dodge-Romig and Military Standard tables.

Concepts of reliability, maintainability and availability, reliability of series and parallel systems and other simple configurations, renewal density and renewal function, survival models (exponential), Weibull, lognormal, Rayleigh, and bath-tub), different types of redundancy and use of redundancy in reliability improvement, problems in life-testing, censored and truncated experiments for exponential models.

II. Optimization Techniques:

Different, types of models in Operational Research, their construction and general methods of solution, simulation and Monte-Carlo methods, the structure and formulation of linear programming (LP) problem, simple LP model and its graphical solution, the simplex procedure, the two-phase method and the M-technique with artificial variables, the duality theory of LP and its economic interpretation, sensitivity analysis, transportation and assignment problems, rectangular games, two-person zero-sum games, methods of solution (graphical and algerbraic).

Replacement of failing or deteriorating items, group and individual replacement policies, concept of scientific inventory management and analytical structure of inventory problems, simple models with deterministic and stochastic demand with and without lead time, storage models with particular reference to dam type.

Homogeneous discrete-time Markov chains, transition probability matrix, classi-fication of states and ergodic theorems, homogeneous continuous-time Markov chains, Poisson process, elements of queueing theory, M/M/1, M/M/K, G/M/1 and M/G/1 queues.

Solution of statistical problems on computers using well known statistical software packages like SPSS.

III. Quantitative Economics and Official Statistics:

Determination of trend, seasonal and cyclical components, Box-Jenkins method, tests for stationery of series, ARIMA models and determination of orders of autoregressive and moving average components, forecasting.

Commonly used index numbers-Laspeyre's, Paashe's and Fisher's ideal index numbers, chain-base index number uses and limitations of index numbers, index number of wholesale prices, consumer price index number, index numbers of agricultural and industrial production, tests, for index numbers like proportionality test, time-reversal test, factor-reversal test, circular test and dimensional invariance test.

General linear model, ordinary least squares and generalised least squires methods of estimation, problem of multicollinearity, consequences and solutions of multicollinearity, autocorrelation and its consequences, heteroscedasticity of disturbances and its testing, test for independence of disturbances, Zellner's seemingly unrelated regression equation model and its estimation, concept of structure and model for simultaneous equations, problem of identification-rank and order conditions of identifiability, two-stage least squares method of estimation.

Present official statistical system in India relating to population, agriculture, industrial production, trade and prices, methods of collection of official statistics, their reliability and limitation and the principal publications containing such statistics, various official agencies responsible for data collection and their main functions.

IV. Demography and Psychometry:

Demographic data from census, registration, NSS and other surveys, and their limitation and uses, definition, construction and uses of vital rates and ratios, measures of fertility, reproduction rates, morbidity rate, standardized death rate, complete and abridged life tables, construction of life tables from vital statistics and census returns, uses of life tables, logistic

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and other population growth curves, fitting a logistic curve, population projection, stable population theory, uses of stable population and quasi-stable population techniques in estimation of demographic parameters, morbidity and its measurement, standard classification by cause of death, health surveys and use of hospital statistics.
Methods of standardisation of scales and tests, Z-scores, standard scores, scores, percentile scores, intelligence quotient and its measurement and uses, validity of test scores and its determination, use of factor analysis and path analysis in psychometry.

ZOOLOGY

PAPER-1

Section-A

1. Non-chordata and chordata :

(a) Classification and relationship of various phyla upto sub-classes; Acoelomata and Coelomata; Protostomes and Deuterostomes, Bilateralia and Radiata; Status of Protista, Parazoa, Onychophora and Hemichordata; Symmetry.

(b) Protozoa : Locomotion, nutrition, reproduction; evolution of sex; General features and life history of Paramaecium, Monocystis, Plasmodium, and Leishmania.

(c) Porifera : Skeleton, canal system and reproduction.

(d) Coelenterata : Polymorphism, defensive structures and their mechanism; coral reefs and their formation; metagenesis; general features and life history of Obelia and Aurelia.

(e) Platyhelminthes : Parasitic adaptation; general features and life history of Fasciola and Taenia and their relation to human.

(f) Nemathelminthes : General features, life history and parasitic adaptation of Ascaris; nemathelminths in relation to human.

(g) Annelida : Coelom and metamerism; modes of life in polychaetes; general features and life history of nereis (Neanthes), earthworm (Pheretima) and leach (Hirudinaria).

(h) Arthropoda : Larval forms and parasitism in Crustacea; vision and respiration in arthropods (prawn, cockroach and scorpion); modification of mouth parts in insects (cockroach, mosquito, housefly, honey bee and butterfly); metamorphosis in insects and its hormonal regulation; social organization in insects (termites and honey bees).

(i) Mollusca : Feeding, respiration, locomotion, shell diversiy; general features and life history of Lamellidens, Pila and Sepia, torsion and detorsion in gastropods.

(j) Echinodermata : Feeding, respiration, locomotion larval forms; general features and life history of Asterias.

(k) Protochordata : Origin of chordates; general features and life history of Branchiostoma and Herdamania.

(l) Pisces : Scales, respiration, locomotion, migration.

(m) Amphibia : Origin of tetrapods; parental care, paedomorphosis.

(n) Reptilia : Origin of reptiles; skull types; status of Sphenodon and crocodiles.

(o) Aves : Origin of birds; flight adaptation, migration.

(p) Mammalia : Origin of mammals; dentition; general features of egg laying mammals, pouched-mammals, aquatic mammals and primates; endocrine glands and other hormone producing structures (pituitary, thyroid, parathyroid, adrenal, pancreas, gonads) and their interrelationships.

(q) Comparative functional anatomy of various systems of vertebrates (integument and its derivatives, endoskeleton, locomotory organs, digestive system, respiratory system, circulatory system including heart and aortic arches; urinogenital system, brain and sense organs (eye and ear).

Section- B

1. Ecology :

(a) Biosphere: Biogeochemical cycles, green-houses effect, ozone layer and its impact; ecological succession, biomes and ecotones.

(b) Population, characteristics, population dynamics, population stabilization.

(c) Conservation of natural resources- mineral mining, fisheries, aquaculture; forestry; grassland; wildlife (Project Tiger); sustainable production in agriculture integrated pest management.

(d) Environmental biodegradation; pollution and its impact on biosphere and its prevention.

II. Ethology :

(a) Behaviour : Sensory filtering, responsiveness, sign stimuli, learning, instinct, habituation, conditioning, imprinting.

(b) Role of hormones in drive; role of pheromones in alarm spreading; crypsis, predator detection, predator tactics, social behaviour in insects and primates; courtship (Drosophila, 3-spine stickleback and birds).

(c) Orientation, navigation, homing; biological rhythms; biological clock, tidal, seasonal and circadian rhythms.

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(d) Methods of studying animal behaviour.

III. Economic Zoology :

(a) Apiculture, sericulture, lac culture, carp culture, pearl culture, prawn culture.

(b) Major infectious and communicable diseases (small pox, plague, malaria, tuberculosis, cholera and AIDS) their vectors, pathogens and prevention.

(c) Cattle and livestock diseases, their pathogens (helminthes) and vectors (ticks, mites, Tabanus, Stomoxys).

(d) Pests of sugar cane (Pyrilla perpusiella), oil seed (Achaea janata) and rice (Sitophilus oryzae).

IV. Biostatistics : Designing of experiments; null hypothesis; correlation, regression, distribution and measure of central tendency, chi square, student t-test, F-test (one-way & two-way F-test).

V. Instrumental methods :

(a) Spectrophotometry, flame photometry, Geiger-Muller counter, scintillation counting.

(b) Electron microscopy (TEM, SEM).

PAPER-II

Section-A

I. Cell Biology :

(a) Structure and function of cell and its organelles(nucleus, plasma membrane, mitochondria, Golgi bodies, endoplasmic reticulum, ribosome's and lysosomes), cell division (mitosis and meiosis), mitotic spindle and mitotic apparatus, chromosome movement.

(b) Watson-Crick model of DNA, replication of DNA, protein synthesis, transcription and transcription factors.

II. Genetics

a) Gene structure and functions; genetic code.

(b) Sex chromosomes and sex determination in Drosophila, nematodes and human.

(c) Mendel's laws of inheritance, recombination, linkage, linkage maps, multiple alleles, citron concept; genetics of blood groups.

(d) Mutations and mutagenesis : radiation and chemical.

(e) Cloning technology, plasmids and cosmids as vectors, transgenic, transposons, DNA sequence cloning and whole animal cloning (Principles and methodology).

(f) Regulation and gene expression in pro-and eukaryotes.

(g) Signal transduction; pedigree analysis; congenital diseases in human.

(h) Human genome mapping; DNA finger-printing.

III. Evolution

(a) Origin of life

(b) Natural selection, role of mutation in evolution, mimicry, variation, isolation, speciation.

(c) Fossils and fossilization; evolution of horse, elephant and human.

(d) Hardy-Weinberg Law, causes of change in gene frequency.

(e) Continental drift and distribution of animals.

IV. Systematics

(a) Zoological nomenclature; international code; cladistics.

Section-B

I. Biochemistry

(a) Structure and role of carbohydrates, fats, lipids, proteins, amino acids, nucleic acids; saturated and unsaturated fatty acids, cholesterol.

(b) Glycolysis and Krebs cycle, oxidation and reduction, oxidative phosphorylation; energy conservation and release, ATP, cyclic AMP-its structure and role.

(c) Hormone classification (steroid and peptide hormones), biosynthesis and function.

(d) Enzymes : types and mechanisms of action; immunoglobulin and immunity; vitamins and coenzymes.

(e) Bioenergetics.

II Physiology (with special reference to mammals)

(a) Composition and constituents of blood; blood groups and Rh factor in human; coagulation, factors and mechanism of coagulation; acid-base balance, thermo regulation.

(b) Oxygen and carbon dioxide transport; haemoglobin : constituents and role in regulation.

(c) Nutritive requirements; role of salivary glands, liver, pancreas and intestinal glands in digestion and absorption.

(d) Excretory products; nephron and regulation of urine formation; osmoregulation.

(e) Types of muscles, mechanism of contraction of skeletal muscles.

(f) Neuron, nerve impulse-its conduction and synaptic transmission; neurotransmitters.

(g) Vision, hearing and olfaction in human.

(h) Mechanism of hormone action.

(I) Physiology of reproduction, role of hormones and phermones.

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III. Developmental Biology

(a) Differentiation from gamete to neurula stage; dedifferentiation; metaplasia, induction, morphogenesis and morphogen; fate maps of gastrulae in frog and chick; organogenesis of eye and heart, placenation in mammals.

(b) Role of cytoplasm in and genetic control of development; cell lineage; causation of metamorphosis in frog and insects; paedogenesia and neoteny; growth, degrowth and cell death; ageing; blastogenesis; regeneration; teratogenesis; neoplasia.

(c) Invasiveness of placenta; in vitro fertilization; embryo transfer, cloning.

(d) Baer's law; evo-devo concept.

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APPENDIX-II

INSTRUCTIONS TO THE CANDIDATES FOR FILLING ONLINE APPLICATIONS

Candidates are required to apply online by using the website https://upsconline.gov.in/.

Salient features of the system to online Applications Form are given hereunder:

1. Detailed instructions for filling up Online Applications are available on the above mentioned website.
2. Candidates will be required to complete the Online Application Form containing four stages viz. Part-I (OTR) Profile , Part-II (Application Form), Part-III (DAF) & Part-IV (Fees, Photograph, Signature & Examination Centre Selection).
3. The candidates are required to pay a fee of Rs.100/- (Rupees One Hundred only) [Except SC/ST/Female/Persons with Benchmark Disability candidates who are exempted from payment of fee] either by remitting the money in any branch of State Bank of India by cash, or by using net banking facility of any bank or by using any Visa/Master/RuPay/Credit/ Debit Card/UPI Payment.
4. Before start filling up Online Application, a candidate must have his photograph and signature duly scanned in the .jpg format in such a manner that each file should not exceed 300 KB each and must not be less than 50 KB in size for the photograph and signature.
5. A candidate must have his/her Matriculation Certificate ready prior to filling up his/her application form. The details viz. Candidate's Name, Father's Name, Mother's Name & Date of Birth to be filled in Online Application Form of the candidate should match exactly with particulars mentioned in the Matriculation Certificate.
6. In addition to this, candidate should also have details of one photo ID viz. Aadhar Card/Vote Card (EPIC) /PAN Card/Passport/Driving Licence/Any other photo ID Card issued by the State/Central Government. The details of this photo ID will have to be provided by the candidate while filling up the online application form. **The candidates will have to upload a scanned copy of the Photo ID whose details have been provided in the online application by him/her.** This photo ID will be used for all future referencing and the candidate is advised to carry this ID while appearing for Examination/Personality Test.
7. The Online Applications (Part-I, Part-II, Part-III and Part-IV) can be filled from **22nd January, 2025 to 11th February, 2025 till 6:00 P.M..**
8. The applicants must ensure that while filling their Application Form, they are providing their valid and active e-mail Ids as the Commission may use electronic mode of communication while contacting them at difference stages of examination process.
9. The applicants are advised to check their e-mails at regular intervals and ensure that the email address ending with @nic.in and @ gov.in are directed to their inbox folder and not to the SPAM folder or any other folder.
10. **Candidates are strongly advised to apply Online well in time without waiting for the last date for submission of online application.**
11. Applicants should not submit multiple applications.

APPENDIX-III

IMPORTANT INSTRUCTIONS TO WITHDRAW APPLICATION

The candidates will not be allowed to withdraw their applications after submission of the same.

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Appendix IV

Special Instruction to candidates for objective type tests

1. Articles permitted inside Examination Hall

Clip board or hard board (on which nothing is written), a good quality black ball pen for making responses on the Answer Sheet. Answer Sheet and sheet for rough work will be supplied by the invigilator.

2. Articles not permitted inside Examination Hall

Do not bring into the Examination Hall any article other than those specified above e.g. books, notes, loose sheets, electronic or any other type of calculators, mathematical and drawing instruments, Log Tables, stencils of maps, slide rules, Test Booklets, rough sheets pertaining to earlier session(s), etc.

Mobile phones, bluetooth or any other communication devices are not allowed inside the premises where the examination is being conducted. Any infringement of these instructions shall entail disciplinary action including ban from future examinations. Candidates are advised in their own interest not to bring any of the banned items including mobile phones, to the venue of the examination, as arrangements for safekeeping cannot be assured.

3. Penalty for wrong Answers (in Objective Type Papers)

THERE WILL BE PENALTY (NEGATIVE MARKING) FOR WRONG ANSWERS MARKED BYA CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS.

(i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, one third (0.33) of the marks assigned to that question will be deducted as penalty.

(ii) If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct and there will be same penalty as above for that question.

(iii) If a question is left blank i.e. no answer is given by the candidate, there will be no penalty for that question.

4. **Unfair means strictly prohibited**

No candidates shall copy from the papers of any other candidate nor permit his papers to be copied nor give nor attempt to give not obtain nor attempt to obtain irregular assistance of any description.

5. **Conduct in Examination Hall**

No candidates should misbehave in any manner or create disorderly scene in the Examination Hall or harass the staff employed by the Commission for the conduct of the examination. Any such misconduct will be severely penalised.

6. **Answer Sheet Particulars**

(i) Write in black ball pen your Centre and subject followed by Test Booklet series (in bracket), subject code and roll number at the appropriate space provided on the Answer Sheet at the top. Also encode your booklet series (A, B, C or D as the case may be), subject code and roll number with black ball pen in the circles provided for the purpose in the Answer Sheet. The guidelines for writing the above particulars and encoding the above particulars are given in Annexure. In case the booklet series is not printed on the Test Booklet or Answer Sheet is unnumbered, please report immediately to the invigilator and get the Test Booklet/Answer Sheet replaced.

(ii) Candidates should note that any omission/mistake/discrepancy in encoding/filling of details in the OMR answer sheet, especially with regard to Roll Number and Test Booklet Series Code, will render the answer sheet liable for rejection.

(iii) Immediately after commencement of the examination please check that the Test Booklet supplied to you does not have any unprinted or torn or missing pages or items etc. If so, get it replaced by a complete Test Booklet of the same series and subject.

7. Do not write your name or anything other than the specific items of information asked for, on the Answer Sheet/Test Booklet/sheet for rough work.

8. Do not fold or mutilate or damage or put any extraneous marking in the Answer Sheet. Do not write anything on the reverse of the Answer Sheet.

9. Since the Answer Sheets will be evaluated on computerised machines, candidates should exercise due care in handling and filling up the Answer Sheets. **They should use black ball pen only to darken the circles. For writing in boxes, they should use black ball pen. Since the entries made by the candidates by darkening the circles will be taken into account while evaluating the Answer Sheet on computerised machines, they should make these entries very carefully and accurately. The candidate must mark responses in the Answer Sheet with good quality black ball pen.**

10. **Method of marking answers**

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In the "OBJECTIVE TYPE" of examination, you do not write the answers. For each question (hereinafter referred to as "Item") several suggested answers (hereinafter referred to as "Responses") are given. You have to choose one response to each item. The question paper will be in the Form of TEST BOOKLET. The booklet will contain item bearing numbers 1, 2, 3 etc. Under each item, Responses marked (a), (b), (c), (d) will be given. Your task will be to choose the correct response. If you think there is more than one correct response, then choose what you consider the best response.

In any case, for each item you are to select only one response. If you select more than one response, your response will be considered wrong. In the Answer Sheet, Serial Nos. from 1 to 160 are printed. Against each numbers, there are circles marked (a), (b), (c) and (d). After you have read each item in the Test Booklet and decided which one of the given responses is correct or the best, you have to mark your response by completely blackening to indicate your response.

Ink pen or pencil should not be used for blackening the circle on the Answer Sheet.

For example, if the correct answer to item 1 is (b), then the circle containing the letter (b) is to be completely blackened with black ball pen as shown below :-

Example : (a) • (c) (d)

11. **Entries in Scannable Attendance List**

Candidates are required to fill in the relevant particulars with black ball pen only against their columns in the Scannable Attendance List, as given below :-

i) Blacken the circle (P) under the column (Present/Absent)
ii) Blacken the relevant circle for Test Booklet Series iii) Write Test Booklet Serial No.
iv) Write the Answer Sheet serial No. and also blacken the corresponding circles below
v) Append signature in the relevant column

12. Please read and abide by the instructions on the cover of Test Booklet. If any candidate indulges in disorderly or improper conduct, he will render himself liable for disciplinary action and/or imposition of a penalty as the Commission may deem fit.

13. The candidates are not allowed to leave the Examination Hall before the expiry of prescribed time period of the examination.

Annexure

How to fill in the Answer Sheet of objective type tests in the Examination Hall

Please follow these instructions very carefully. You may note that since the Answer Sheets are to be evaluated on machine, any violation of these instructions may result in reduction of your score for which you would yourself be responsible.

Before you mark your responses on the Answer Sheet, you will have to fill in various particulars in it.

As soon as the candidate receives the Answer Sheet, he/she should check that it is numbered at the bottom. If it is found unnumbered he/she should at once get it replaced by a numbered one.

You will see from the Answer Sheet that you will have to fill in the top line, which reads thus:

केंद्र	विषय	विषय कोड		अनक्रमांक	
-------	--------	----------		----------	
Centre	Subject	S. Code		Roll Number	

If you are, say, appearing for the examination in Delhi Centre for the General Studies Paper and your Roll No. is 081276 and your Test Booklet series is 'A', you should fill in thus, using ball pen.

* This is just illustrative and may not be relevant to the Examination concerned.

केंद्र	विषय	विषय कोड		अनक्रमांक	
-------	--------	----------		----------	
Centre	Subject	S. Code	9 9	Roll Number	0 8 1 2 7 6
Delhi	General Studies				

You should write with black ball pen the name of the centre and subject in English or Hindi. The test Booklet Series is indicated by Alphabets A, B, C or D at the top right hand corner of the Booklet. Write your Roll Numbers exactly as it is in your **e-Admit Card** in the boxes provided for this purpose. Do not omit any zero(s) which may be there.

The next step is to find out the appropriate subject code from the Time Table. Now encode the Test Booklet Series, Subject Code and the Roll Number in the circles provided for this purpose. Do the encoding with black pen. The name of the Centre need not be encoded.

Writing and encoding of Test Booklet Series is to be done after receiving the Test Booklet and confirming the Booklet Series from the same.

For General Ability subject paper of 'A' Test Booklet Series you have to encode the subject code, which is 99. Do it thus.

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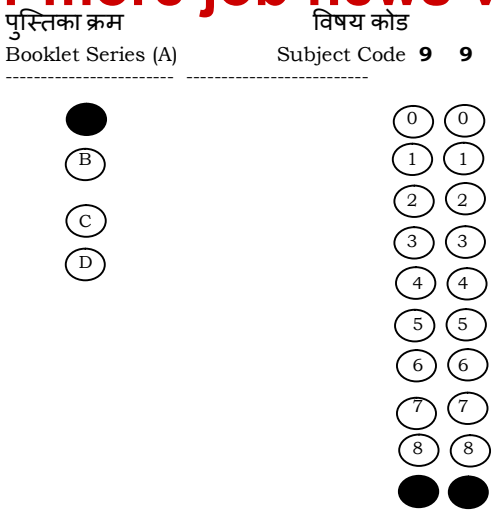
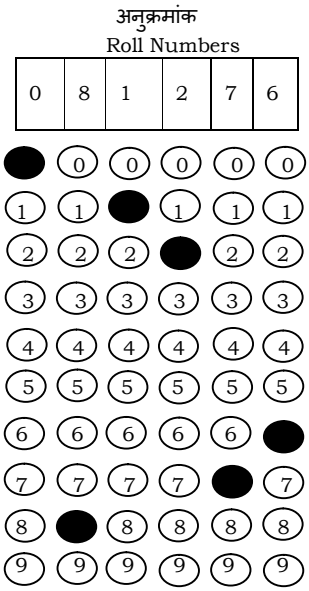


All that is required is to blacken completely the circle marked 'A' below the Booklet Series and below the subject code blacken completely the Circles for '9' (in the first vertical column) and '9' (in the second vertical column). You should then encode the Roll No. 081276. Do it thus similarly.



Important : Please ensure that you have have carefully encoded your subject, Test Booklet Series and Roll Number.

* This is just illustrative and may not be relevant to your Examination.

Appendix – V

Certificate regarding physical limitation in an examinee to write

This is to certify that, I have examined Mr./Ms./Mrs..... (name of the candidate with benchmark disability), a person with ..... (nature and percentage of disability as mentioned in the certificate of disability), S/o/D/o....., a resident of ..... (Village/District/State) and to state that he/she has physical limitation which hampers his/her writing capabilities owing to his/her disability.

Signature

Chief Medical Officer/Civil Surgeon /
Medical Superintendent of a Government Health Care Institution.

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Note: Certificate should be given by a specialist of the relevant stream/disability (e.g. Visual Impairment – Ophthalmologist, Locomotor disability – Orthopaedic specialist/PMR).

Appendix – VI

Letter of Undertaking for Using Own Scribe
(To be filled by the candidates online to the Commission)

I……., a candidate with……(name of the disability) appearing for the …… (name of the examination)…….. bearing Roll No…….. at …….. (name of the centre) in the District ……., ……. (name of the State). My qualification is ……..

I do hereby state that …… (name of the scribe) will provide the service of scribe/reader/lab assistant for the undersigned for taking the aforesaid examination.

I do hereby undertake that his qualification is …… In case, subsequently it is found that his/her qualification is not as declared by the undersigned and is beyond my qualification, I shall forfeit my right to the post and claims thereto.

(Signature of the candidates with Disability)

Place:

Date:

Appendix-VII

Certificate for person with specified disability covered under the definition of Section 2(s) of the RPwD Act, 2016 but not covered under the definition of Section 2(r) of the said Act, i.e. persons having less than 40% disability and having difficulty in writing

This is to certify that, we have examined Mr./Ms./Mrs…… (name of the candidate), S/o/D/o ……, a resident of …… (Vill/PO/PS/District/State), aged …… yrs, a person with …… (nature of disability/condition), and to state that he/she has limitation which hampers his/her writing capability owing to his/her above condition. He/she requires support of scribe for writing the examination.

2. The above candidate uses aids and assistive device such as prosthetics & orthotics, hearing aid (name to be specified) which is/are essential for the candidate to appear at the examination, with the assistance of scribe.

3. This certificate is issued only for the purpose of appearing in written examinations conducted by recruitment agencies as well as academic institutions and is valid upto …… (it is valid for maximum period of six months or less as may be certified by the medical authority)

Signature of medical authority

(Signature & Name)	(Signature & Name)	(Signature & Name)	(Signature & Name)	(Signature & Name)
Orthopedic/PMR Specialist	Clinical psychologist/ Rehabilitation Psychologist/ Psychiatrist/Special Educator	Neurologist (if available)	Occupational therapist (if available)	Other Expert, as nominated by the Chairperson (if any)
(Signature & Name)				
Chief Medical Officer / Civil Surgeon / Chief District Medical Officer …… Chairperson				

Name of Government Hospital / Health Care Centre with seal

Place :

Date :

Appendix-VIII

Letter of Undertaking by the person with specified disability covered under the definition of Section 2(s) of the RPwD Act, 2016 but not covered under the definition of Section 2(r) of the said Act, i.e. persons having less than 40% disability and having difficulty in writing

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I....., a candidate with ..... (nature of disability/condition) appearing for the ..... (name of the examination) bearing Roll No..... at ..... (name of the centre) in the District .....,..... (name of the state). My educational qualification is .....

2. I do hereby state that ..... (name of the scribe) will provide the service of scribe for the undersigned for taking the aforementioned examination.

3. I do hereby undertake that his qualification is ..... In case, subsequently it is found that his qualification is not as declared by the undersigned and is beyond my qualification, I shall forfeit my right to the post or certificate/diploma/degree and claims relating thereto.

(Signature of the candidate)

Place :

Date :